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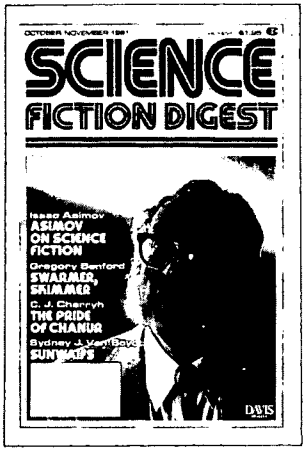

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Vol. 5, No. 11 (whole no. 45) 26 October 1981

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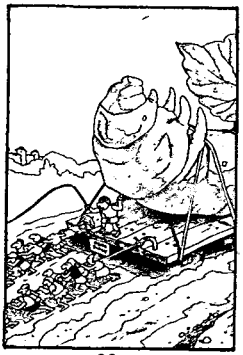

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Published 13 times a year by Davis Publications, Inc., at $1.50 a copy; annual subscription of thirteen issues $19.50 in the United States and U.S. possessions; in all other countries $22.75, payable in advance in U.S. funds. Address for subscriptions and all correspondence about them: P.O. Box 1933, Marion OH 43305. Address for all editorial matters: Box 13116, Philadelphia, PA 19101. Isaac Asimov's Science Fiction Magazine® is the registered trademark of Davis Publications, Inc.

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Controlled circulation postage paid at Dallas, PA. POSTMASTER: send form 3579 to IAsfm, Box 1933, Marion OH 43306. ISSN 0162-2188.

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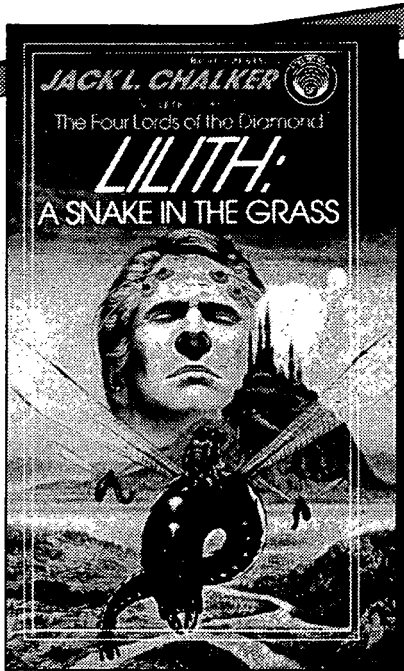

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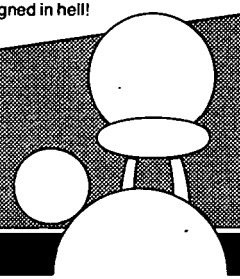

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EDITORIAL: THE *NEW YORK TIMES* LAUGHS AGAIN

by Isaac Asimov

art: Frank Kelly Freas

Sometimes I wonder what the characteristics may be that qualify a person to write editorials for the *New York Times*. They don't necessarily have to be very demanding, of course, since the editorials in the *Times* (unlike those in this periodical) are unsigned, so that no one person ever has to stand behind his words.

My own feeling, though, is that when it comes to science and technology, *New York Times* editorial writers must be put through severe and thorough tests on scientific knowledge and foresight. If they fail, and fail handsomely with lots of room to spare, they are snapped up. If, on the other hand, they fail only narrowly, and qualify otherwise (nice appearance, good command of language, ability to drink three martinis in rapid succession) they are asked to take a six-week crash-course in science-stupidity.

But to cases—

In 1903, the American astronomer, Samuel Pierpont Langley, made the last of three attempts to build a heavier-than-air flying machine that would work. For the purpose, he received a $50,000 grant from the American government, which was not blind to the possible military application of airplanes.

Langley just barely missed. His third attempt would have worked if he had had a slightly more powerful engine in it.

After the third attempt, however, the *New York Times* obtained an editor somewhere who wrote an editorial on the subject. Langley was castigated for wasting public funds foolishly because anyone with the brains of a *New York Times* editorial writer could see that human beings would not fly for a thousand years.

Nine days after the editorial appeared (nine days!), the thousand years suddenly ran out when the Wright brothers flew their plane at Kitty Hawk.

I don't suppose the *New York Times* ever apologized.

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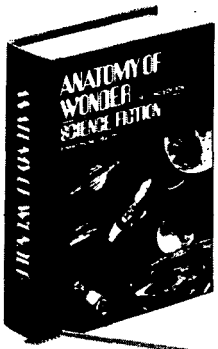

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Another case! In the 1920s, Robert Hutchings Goddard was experimenting with small liquid-fueled rockets. He was doing so in Worcester, Massachusetts, and the neighbors complained. The rockets made a noise and might be dangerous. (They might be, at that.) Goddard therefore transferred the site of action to New Mexico with the help of a Guggenheim grant of $50,000.

The *New York Times* sped him on his way with one of its editorial specials. They found an editorial writer who claimed he had gone to high school and put him to work. The writer laughed heartily at Goddard, saying that of course his rockets couldn't work once out in space, for as every high school student knows, rockets have nothing to push against in the vacuum of space.

Admittedly, those high school students no brighter than a *New York Times* editorial writer knew that. Isaac Newton, however, and many high school students who had passed their tests, knew that rockets would work in outer space; and, in fact, it was rockets at last that carried men to the Moon. In this case, the *New York Times* did apologize when Neil Armstrong landed on Lunar soil.

Which brings us to the present day.

It seems that a NASA advisory council has recommended a project that will have astronomers engage in spotting and tracking sizable objects in the vicinity of Earth, calculating their orbits, and then keeping them in view, to determine if, when, and how those orbits might be perturbed and modified by the gravitational pull of various planets. Then, if one of them ever seemed to have moved into a possible collision course with Earth, a spacecraft armed with a hydrogen bomb could nudge it aside. What would be needed was an initial appropriation of $100,000,000.

The *New York Times* got to work at once. An editorial on the subject in a department called "Topics" was published on February 17, 1981.

The reason I noticed it was that, by coincidence, on the very day before, I had given a lively talk to a luncheon meeting of the Dutch Treat Club, a fine organization to which I belong, and had recommended just that sort of project. I did not know that NASA was getting into the act at the time I made the talk, but that didn't matter. I'd been at it a long time. I first suggested such a project in an article entitled "Big Game Hunting in Space" in the August 1959 issue of a magazine called "Space Age"—twenty-two years ago.

The first sentence of the *New York Times* editorial reads, "Leave it to the space nuts to drive concern over environmental risks to new heights."

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"Space nuts"? Who are the "Space nuts"? They must be you and I, O Gentle Readers. Surely we recognize ourselves. It's we space nuts who, back in 1903, would probably have felt that man would fly in less than a thousand years. It's we space nuts who, back in 1929, would have known that rockets would work in a vacuum and who would have felt that human beings would reach the Moon somehow.

We didn't have the kind of chic expertise that kept the *New York Times* editorial writers laughing at silly things like that.

The editorial writer seemed to think the project had arisen out of the fact that there is an impression right now that an asteroid collision with Earth 65,000,000 years ago killed off all the large animals on the planet, including the dinosaurs, and nearly sterilized it altogether.

The thought of being concerned about something that happened 65,000,000 years ago inspired the editorial writer to happy heights of sarcasm. He writes, ". . . who . . . could possibly begrudge the space enthusiasts the paltry $100 million needed to check out the deflectability of an asteroid? Such knowledge may prove useful over the next 65 million years."

Well, sure! Any person with the brains of a *New York Times* editorial writer would know that if something happened 65 million years ago, it isn't going to happen again until 65 million years from now. After all, figure it out. The last time a world war started was 42 years ago. Therefore, we know for sure there won't be another world war until 42 years from now. That's 2023, so why worry about possible world wars *now,* for goodness sake?

As a matter of fact, it was in this very century that two heavy collisions of outer space material with Earth took place. Fortunately for us, both—one in 1908 and one in 1947—struck uninhabited portions of Siberia.

Both, however, were city-busters, in the sense that if either one had happened to strike a good-sized city they would have snuffed out every life in it in minutes. What's more, if such a city-buster were to zero in *now* and strike a city in either the United States or the Soviet Union, the nation damaged might suspect a sneak nuclear strike and might well retaliate instantly under the impression that there was no time to waste checking the matter. And that would give us a thermonuclear war.

The NASA advisory council mentioned this possibility of starting a thermonuclear war, and the *New York Times* editorial writer mentioned it, too. I suspect that the possibility of such a war made

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the proposal seem funnier than ever to him.

I must admit there's not much chance of this happening very soon. The chance, however, is not zero. A large meteor skimmed by Earth in 1974 and passed through the atmosphere. It missed Montana by just 36 miles straight up. A microscopic change in orbit and it would have gouged out a hole half a mile across—possibly in Helena.

But $100,000,000!

Come on, you space nuts! A hundred million dollars just to fight off the small off-chance of destroying a city and starting a thermonuclear war?

Perhaps we should put that sum into perspective. The nations of the world are spending $100,000,000 on their war machines every two hours! A single modern bomber of the kind the United States keeps wondering about whether to build costs *over* $100,000,000. That's one plane, for Goodness' sake.

If we can spend that much on one plane and are thinking of building a fleet of them—just on the off-chance that they may create plenty of mayhem and destruction—is it such a terrible crime to spend that much money on a project that might *prevent* mayhem

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and destruction?

From where we sit, you and I, in our science fictional worlds, we don't see things with the zero-foresight of *New York Times* editorial writers. Perhaps it might help if they were to be encouraged to read a science-fiction magazine such as this one in order that they might learn about the real world.

But I suspect they won't. I'm afraid they are too attached to their world in which human beings can't fly and rockets can't work and the Moon can't be reached and large meteorites never hit the Earth.

Too bad!

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ON BOOKS
by Baird Searles

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Well, it was bound to come up. I'd been putting off getting into it as long as possible, but there comes a point at which the inevitable discussion of science fiction vs. fantasy—no, that's wrong, not necessarily vs.; let's say science fiction and/or fantasy—has to rear its ambiguous head.

It's sparked here, now, by a couple of things. At the Nebula awards last April, a remark heard more than once was that Gregory Benford's *Timescape* won the prize for the best novel because it was the only real work of SF among the nominees (which included such works as Wolfe's *Shadow of the Torturer,* Vinge's *Snow Queen,* and Silverberg's *Lord Valentine's Castle*). And then some nattery correspondence to this column—a minority, admitted (most of the writers-in are very agreeable—in both senses of the word—most unusual), but annoying, to the effect of why don't you review more *real* science fiction?

Both matters are annoying, in fact, because they assume only one absolute definition of SF, belonging to the speaker. And in these cases, that happens to be a very narrow one. Now if people want to limit their own pleasure, that's fine with me, *but* don't try to force those limitations on me and the rest of my readers.

So, just to clarify the matter one more time, to clarify where *I* consider the tenuous, at best, boundaries lie, and just to get my licks in, yet again a definition of SF, which I might illustrate with the books I have to talk about this time. (Apologies to the authors for *using* their books in this way, but I hope to say something useful in their terms, also. I still prefer this column to be about books, primarily, and not my own theories.)

Science fiction is a form of fantasy in which the fantasy elements (those that are unlikely, improbable, or downright impossible) are justified by the use of scientific or pseudoscientific rationalization,

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and are therefore "natural." Ghost stories and "pure" fantasy are those forms of fantasy in which the fantasy elements are simply presented as supernatural, i.e. *beyond* the natural.

Got that? It's pretty simple, really, but just one added factor. There are *no* firm boundaries and lots of in betweens.

Now, from pure perversity, I'm going to lead off with a fantasy, something, so far as I remember, I've not done before—*in my terms* (and let's have that phrase understood for the rest of the piece, so I don't have to repeat it).

And it's an epic fantasy, indeed. But if you're thinking epic in terms of heroes and dragons, quests and conquests, forget it. John Crowley's *Little, Big* is big in size, but little in landscape. It's about a house and a family, mainly, and has the preoccupation with detail of a Victorian novel. It's something like *Mary Poppins* written by Anthony Trollope.

That, literally, is only part of the story, though. The implications of *Little, Big* are epic, and there is a war involved, though you don't see much of it. And if all of this sounds contradictory, well, it is. *Little, Big* is a True Original, hard to describe, even harder to form an opinion about.

Every paragraph, every sentence is incredibly dense with facts and characters (the family is a large one and we get to know several generations); it is not an easy book to read, nor is there any way I can devote to it here the space it deserves. In brief, though, the war is that of Faëry and humanity, and the family that is the center of the book are (mostly unknowing) agents, fifth columnists as it were, for Faëry, whose forces and powers almost never appear directly, but are only suggested or evoked obliquely.

Reference hunters and influence seekers will have a field day here; there is overt and subtle usage of everything from Frederick Barbarossa to Palmer Cox's *Brownies,* Pellucidar to Dr. Doolittle, the Old Mother West Wind tales of Thornton W. Burgess to Carroll's Alice (three sisters are named Tacey, Lily, and Lucy, for God's sake!).

Not an easy book, and I'm not sure it's a successful one; Crowley is another writer who might have waited to learn clarity from complexity before trying a *magnum opus*. But it's sure to cause talk; it might well be to fantasy what Delany's *Dhalgren* was to SF.

While Crowley slightly clouded the issue of genre in *Little, Big* by setting some of it in the near future (if the whole thing isn't set in a mythical past), it is certainly a fantasy, about as thoroughgoing a fantasy as you can find. Now what about a modestly grisly little

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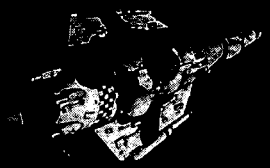

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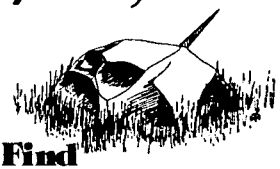

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offering from the venerable publisher in the Midwest known for its tradition of publishing the supernatural? Titled *The Third Grave,* by David Case, it's an old-fashioned number about Egyptologists and their mummy in an ancient house in rural England, some nastily done murders, and a great deal of the usual mumbo jumbo about forgotten Egyptian knowledge, with a little from Haiti *re* voodoo and zombies thrown in for good measure.

Alas, it's nowhere near as much fun as many of the older examples of such nonsense, being awkwardly written and peopled with a remarkably dumb cast of characters. (The hero/narrator makes old Dick Foran of *The Mummy's Hand* look scintillating). But I must point out that it *is* science fiction, as so many of that horror genre are. Why? Because nowhere is anything supernatural invoked. All the unlikely events come out of the pseudoscientific, "lost" knowledge. So it's not good science, it's certainly not good science fiction; but we're not talking quality, we're talking category, and there it is.

And what about the subgenre of alternate time tracks? I've run into that primarily as science fiction, often linked with its sister subgenre, time travel. But every rationalization of those particular impossibilities has to be just as much mumbo jumbo as the above-mentioned hierogibberish, though hopefully more convincingly presented.

There's a current alternate-universe story on hand, however, that doesn't indulge in any rationalization, but simply presents the change in history as a *fait accompli.*

The change is a simple one, the invention of a large British lighter-than-air ship. Which, unfortunately, falls on the entire Royal Family and squashes it flat—all of it.

So the British Empire is without a head. After hopelessly exploring all of Victoria's foreign descendants, the powers that be come up with a Cornish farm lad turned actor who just happens to be the grandson of Victoria's eldest so, the Duke of Clarence, through a secret marriage. (Clarence died before he could ascend to the throne.) *Headlong,* by Emlyn Williams (a well-known British actor), is that unfortunate lad's story.

I found it downright captivating. King John II tells us his own history, dwelling mostly on the year 1935, when both the Royal Squashing and his Coronation take place. For theater buffs, there's a wonderful picture of the theater in London in the '30s, using all sorts of real names. For monarchists (which I think most SF and fantasy fans really are, deep down), John gives a portrait of the day-

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to-day life of a British king, which is humorous, pretty accurate, and hair-raising in its stultifying boredom.

Unfortunately, I found the ending of the book both a surprise and a bit of a letdown; however, on thinking about it, I could see no other possible way for Williams *to* end it (though part of the author's job, of course, is to surprise us with things we mortals would *not* think of). Enough backing and filling on that point; the rest of the book is more than worth it.

And, while alternate universes are more often than not presented as SF, as I noted earlier, I can only categorize *Headlong* as a fantasy, and, to contradict in terms, a "realistic" one at that.

Then there's the relatively new fashion of the attempt to have the best of both worlds, to combine SF and fantasy under one cover. Marion Bradley does this beautifully in one way, Jack Vance in another. Vance, in fact, may be the progenitor of this hybrid, or at least its current manifestation.

Unfortunately, when this combined form flops, it seems to flop twice as hard as single-genre works. And I'm afraid David M. Alexander's *Fane* really flops. He pays a gracious debt to Vance in his dedication, and the work is certainly Vance-ish in its approach. Alexander sets up his combo right off on the first page—"For unknown reasons, perhaps the interaction of the storm with Fane's peculiar modulating magnetic field, the relationship here of man and matter was changed. . . . Magic, sorcery and spells built a new technology to fill the void."

Fane is a multiracial world; of the three races, one is indigenous, the other two, of which one is Earth human, are descended from a colony ship stranded by Fane's peculiar qualities.

The hero of the book is the maladept nephew of a master wizard. Sent to pick up a powerful ring for his uncle, bumbling Grantin manages to get it stuck on his finger, which leads to various confusions and misadventures among the magic mongers and enchanters of Fane.

I'm afraid it just doesn't come off, and mainly because the writing is consistently heavy and obvious throughout. I don't demand the high style of a Gene Wolfe all the time, but this kind of thing has to be light as a soap bubble to work (witness Vance), and leaden prose just does it in. Nevertheless, readers who aren't too demanding might like *Fane* for its zipalong plot and the myriad magical devices.

The two reprints of the month fit neatly right into our theme,

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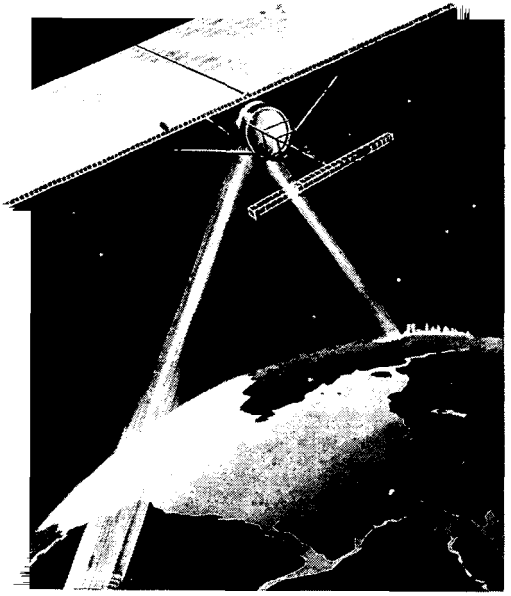

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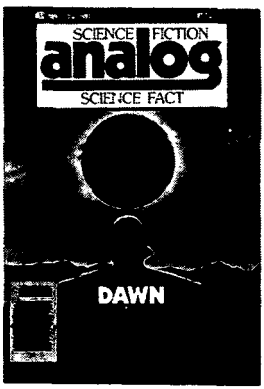

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luckily enough. As I implied above, there's been at least one other cycle of combined science fiction and fantasy, and that was back in the early days of the magazines. *Weird Tales,* for instance, printed in the 1920s and '30s much that would be considered SF today, on the theory that anything extraterrestrial was as weird as any supernatural manifestation. But a combined form of the two genres was also popular; someone back then dubbed it, straightforwardly, "science fantasy."

Clark Ashton Smith is the least known of "the Three Musketeers of Weird Tales" (the others were Lovecraft and Howard); it is nonetheless shocking that none of his work has been in print in paperback for some years.

The situation is partially remedied by the release of a new collection of his short stories (Smith wrote no novels), *The City of the Singing Flame.* He was a prime practitioner of "science fantasy"; many of his stories are set on other planets, known or unknown, or in "other dimensions," but this was really just an excuse to use his poet's pen to describe exotic landscapes and creatures, which he does with prose that might be too purple for today's taste, but which I, for one, revel in.

The title story is typical. The writer discovers an interdimensional portal between two boulders on a mountain ridge, walks through into a dreamlike landscape, discovers a gorgeous city in the middle of which is a singing flame into which strange and alien creatures of many kinds are drawn and devoured. He, too, cannot resist the siren call of the flame and dives in, only to discover that it, too, is an interdimensional portal which leads . . .

Lots of description, almost no plot. As I said, not to everyone's taste, but for those whose taste it is, thank goodness there's at least some of Smith's work available.

Science fantasy tended more toward what we now think of as supernatural rather than the Tolkienesque; Fritz Leiber took a different slant on the supernatural in his 1943 novel, *Conjure Wife,* one of that author's several masterpieces. In it, he presents us with a quiet provincial college in which the faculty wives are practicing witches, using the art to further their unaware husbands' careers. Witchcraft is coolly presented as simply an alternate science, so is this one fantasy or SF? I throw up my hands at that question, but at least this edition is not being presented as a Gothic, which is the way the novel's former publisher had put it out.

So have I made the point? The line between SF and fantasy is not a hard and fast one, and those overly zealous purists who confine

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the idea of science fiction to the high-tech stuff, as practiced (expertly) by Niven, Hogan, and Anderson, for instance, will have to face the fact that there are more things in heaven and Earth than are dreamt of in their philosophy.

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by
Ian Watson

THE ARTISTIC TOUCH

art: Wayne D. Barlowe

Ian Watson sold his first story to the British magazine New Worlds *in 1969. Since then he has gained a considerable reputation as a novelist with such works as* The Embedding, The Jonah Kit, The Martian Inca, *and* Miracle Visitors. *His one collection of stories is* The Very Slow Time Machine. *His most recent noel is a collaboration with Michael Bishop. This is his first story for* IA'sfm.

"Here is one Chaos."

Rollo Tustian offered a white egg-shaped object to the alien procurator. In the fat end of the eggshell was a lens.

The Procurator of Artistic Licence was a nimble, six-armed creature who resembled a large speckled crab. In common with all her race she had no legs, only arms. Accepting the offering in her fore-

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pincers, she squeezed it very gently. It felt far less fragile than an egg.

Shutting her two ordinary eyes, she squinted through the lens with her third, artistic eye. At first she sensed great depth, into which she could fall for ever and for ever; and then she sensed no depth at all, as though there was only a two-dimensional skin of slime inside. Or a flat mist: of the colour of nausea. Exactly what that colour was, she couldn't decide.

Puzzled, she returned the object.

Tustian dropped it back into the pouch slung from his belt. Rummaging, he produced another 'egg,' this one with a silver shell.

"And here's a different Chaos."

The Procurator squinted inside this one, too, but it looked identical. Perhaps. Feeling mildly sick, she shut her third eye and returned the egg to Tustian.

And shrugged all three right shoulders.

"I see no difference. They're like the insides of rotten eggs, whisked up. Or like something underwater, in a foetid pond."

"Neither egg nor water, Procurator. Each shell contains a Chaos."

The Procurator picked at her mouth gristle with a claw.

"But how can Chaos be a subject for art? Chaos is where there is no pattern—and art is a pattern-making process." She gestured at the silver ovoid. "There's nothing to experience."

"Ah, the art world has always reacted with a shiver of disgust to the truly new. Take the case of the Impressionists on Earth. They—"

"I'm familiar with your art history, Tustian."

"Well, the art authorities couldn't see the new pattern. They only saw ugliness. But *this*," and Tustian dropped the silver ovoid back into his pouch, "is something quite different—because there is *no new pattern to be seen.* None at all. Only Chaos. Different brands of Chaos. And this is my art. I create a genuine physical Chaos, and bind it in a shell."

The Procurator shrugged, using just one shoulder. The man was simply a hoaxer. He had managed to hoodwink patrons among his own species, and now he hoped to fool an alien species—one moreover noted for its rich aesthetic sensibility, due to that third, aesthetic eye. Presumably he regarded this as a challenge.

If these things *were* Chaos, in the literal sense—which was impossible—then they couldn't be any different from each other, as he claimed. How could one compare one chaos with another? Disorder couldn't be compared with disorder. Chaos couldn't have a plural.

Those things were just rotten eggs. And Rollo Tustian was a

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smooth-talking charlatan.

True, he was bold . . .

Here he perched, up in her work node at a very high point of Great Web with thousands of hands of space beneath him—space cross-hatched by hundreds of strands of the city web, knotting periodically into studios, nipple points, office nests, hatcheries, playpens, aerial amphitheatres, music mazes; and everywhere, high and far, deep and yonder, hung and climbed and scuttled the People of the Web, six-armed legless beings with two ordinary eyes and a third eye which beheld beauty.

Great Web filled up all the valley space between two mountain ranges to a depth of a full mile. To the east, beyond a pass, was the spaceport and aliens' town, linked by an offshoot of the Web. Few aliens felt really at home in the Web, unless they were bird-forms or natural acrobats. Yet Rollo Tustian had ascended nonchalantly, never once losing his way nor his balance. . . .

One segment of Western Web shimmered with live-silk tapestry; another glinted with scintillations of thinly blown glass. Chiming allegros came from the music maze beneath. Dancers festooned another volume of space; that dance had been going on for six years now, with artistes dropping in and dropping out, and still the maypole ballet pattern wasn't complete. Elsewhere, whole crystallized configurations of the web were alive with all the lights of the spectrum. . . .

Fifty cubic miles of Great Web, dedicated to beauty!

And one human being, with sickly little view-shells in his pouch.

"Those things aren't, by any chance, images of hyperspace which you made on the way here?"

"Of course not! Hyperspace has a definite structure—or else there'd be no way through it from world to world. I repeat: each is a genuine Chaos."

"How kind of you to choose our world for your gallery." The Procurator's tone was sarcastic.

Tustian simply laughed.

"No choice of mine, I assure you! I boarded the first ship I came to, when the spirit moved me. For all I knew, it might have been heading right out of the Galaxy."

"You arrived here at random? *By chance?*"

"As random as Chaos, Procurator."

"How very remarkable that chance should have led you to perhaps the most famous of all worlds which patronise the arts!"

The man jiggled his pouch, knocking the shells together.

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"Ah, but you see: there's such a power of Chaos in here. The orderly universe inevitably thrusts me to the most convenient and appropriate place, to compensate for this. That's how my career has proceeded by leaps and bounds. How do you suppose I found my way up here today so effortlessly, without even asking directions? Dear Procurator, the universe *has* to counterbalance what I create by giving me the most non-random of lucky breaks. Always. My next great conquest awaits me here, inevitably. Because I am here, rather than somewhere else."

"I would think that the universe could safely ignore your activities."

"Ah, it dare not—and remain an orderly universe where the laws of physics apply throughout." Rollo Tustian leaned forward precariously, holding on by one casual fingertip, as though daring the web to let him fall. Holding on with two left hands, the Procurator watched him nervously.

"The patrons of my art," said Tustian lightly, "all experience this same phenomenon, once they own a Chaos of their own."

"They find everything organised for their express benefit? They experience supremely good fortune? Ah, so those things are really lucky charms: amulets which somehow compel good luck!"

"They work, Procurator, because the universe organises itself tightly around them to prevent what is inside from breaking out and spreading."

"Then you don't need an artist's licence. You need a sorcerer's licence! Get yourself back down to the Sector of Superstitions over in aliens' town, and apply there."

Tustian shook his head.

"It is art. And it works best upon connoisseurs and artists—because, as you say, they organise beautiful patterns."

"Oh, *now* I see. We simply commission a lot of these things to hang in our Great Web, and as a natural reaction against Chaos we will succeed ever more perfectly in the pursuit of beauty? In that case, you have no art of your own. You're a parasite."

"I am a catalyst . . . of beauty, order, perfection."

"And if I say no?"

"Well, since I'm *here* now . . . I may tell you that there's a limit to the amount of luck, serendipity and perfection that I can soak up myself. Yet an artist has to create—it's like breathing, isn't it? And I happen to create Chaos. Without patrons to absorb the beauty which the universe binds round my creations—why, that Chaos will spill over."

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"Oh, so we're obliged to patronise you, and admire your blessed eggshells, or else you'll put a blight of ugliness upon us?"

"Of disorder. I'm not threatening you, you understand—*I* didn't ask to come here. I simply stepped on board the first ship—which of course was heading towards the center of artistic organisation. The universe sensed that you could best marshall the beautiful order, to baffle my disorder."

The Procurator wrenched at her carapace, to massage the flesh beneath. She had an itch. Really, she should flip this man from the web for his impertinence. He should fall to his death.

Yet somehow, she thought, he wouldn't. And maybe his eggs would break. Or whatever they were.

"So the possession of Chaos forces one to perceive more and more pattern to existence," she mused. "I'm not actually considering granting you a licence—"

"Ah, but you will. Within the hour," said Tustian confidently.

"Yet on the other hands," she went on, waggling a few, "it might be an amusing frivolity: a dash of discord to set off the supreme harmonies of our web."

Tustian smiled.

"*Not* so supreme as all that, or the universe wouldn't have sent me here." He gazed out across Great Web in the direction of the mirror sculpture sector where waterfalls of light cascaded, ever shifting, more splendid than any water or flower garden in nature. "There's room for improvement, I'd say. There's space for much more beauty."

The Procurator hardly hid her chagrin and offense.

"Just how *do* you put Chaos into these shells, preposterous man?"

Tustian chose his words.

"Call mine a psi-talent if you will—but would you ask a musician to describe a tune, so that its tunefulness is apparent? Within me, I sing disorder: the disorder of the infinite set of Chaos out of which the universe randomly occurred. But it isn't a song. It is no-song."

The Procurator waved all six arms at him, almost losing her balance.

"Art is a godly, creative act!"

"Yet Chaos creates your God-universe, where the standards of art apply. Among the infinities of Chaos, one Chaos became so utterly disorderly through random flux that it was no longer chaotic at all: it was this universe, of life. It was bound to happen some time. Oh, the universe is God, randomly born, tied in a loop from beginning to end like a snake giving birth to itself, but this artistic God is only

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singular. Whereas Chaos is plural. I am the voice of Chaos."

"So you're greater than God and the universe? Yet you lay tiny rotten eggs."

"Tiny, in the way *you* see them. Actually, each one surrounds the universe, from within."

The Procurator held on tight. She felt paralysed.

"I judge," she said numbly, "that you would be far better occupied laying your eggs here, than roaming wild among the stars. You might found an anti-religion, of disorder. The frustrated artist becomes the messiah—it has happened before! Oh, we shall absorb you. Our beauty will soak up all your so-called Chaos, and show it up for what it is: emptiness, nothing at all."

Rollo Tustian glanced at his wrist-computer.

"Within the hour, I said. Within the hour it is. Where do I set up my studio?"

Sixty years later, the aging Procurator hunched in her work node high on top of Great Web, by now merely the little inner heart of Greatest Web which covered the whole world with a deep fabric of light, beauty, splendour in all the thirty-six aesthetic modes.

The past ten hexades had witnessed the ultimate High Renaissance of this world's art, over which it had been her pride to preside . . .

. . . to begin with. And then her anxiety. And then her fear. And now her despair.

Nowadays there was nothing but perfect art on this world, and the world was dying unawares. Nowadays the world was only supported from outside: by energy beamed from beyond the atmosphere, by foodstuffs grown off-world, by supplies manufactured elsewhere.

And its art was locked into perfection. Deadly perfect.

Yet only she could see how deadly perfect all this was. Petitioners wondered why she had apparently become an enemy of art, refusing new licences arbitrarily from time to time despite the most shining proof of worth. But such refusals were only drops in the ocean, and in any case she was only Procurator of Great Web. One's work could find favour elsewhere.

Nevertheless, a queue of applicants wound down the web, awaiting an audience. Great Web was still the prestige place to work.

Surefootedly queue-jumping them all, came a human.

It was many hexades since she had last seen Rollo Tustian. The fact that he was still alive did not particularly amaze her, since her own species was relatively long-lived—yet surely he should have

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altered in appearance? By now her own shell was the dark walnut hue of the Fall of Life, and would soon be turning jet-black.

"You look exactly the same," she said, bewildered, doing nothing to scoot him back down to the tail of the queue. In fact, the sight of him looking so youthful—or, at least, identical with what he had been—reminded her yearningly of the time, hexades ago, when all had been well with the world.

Rollo Tustian chuckled.

"It must be a lucky diet for me, here. Or maybe it's the abundance of so much beauty! I told you there was room for improvement, didn't I?" But then he looked sad. "That isn't so, any longer, Procurator. The sponge is full. It can't soak up any more. I must move on, or my mind and body will suffer from disorder. So I came to say goodbye."

"Beauty has beaten you at last—driven you away. Thank Beauty, for that!"

"Not at all. You don't even believe that yourself. Oh, I've heard of your eccentric, spasmodic attempts to stem the tide. We once had a king on Earth called King Canute."

"You devil. Why did you come here to destroy us?"

Tustian gestured out across the dazzle of Great Web. His arm circled the horizon. Greatest Web began in all directions, entirely covering the mountains, growing across the whole land surface of the world, on and on. Beyond where the eastern mountains were once visible, a constant stream of shuttle craft ascended and descended, bringing in food concentrates and the raw materials for more art. The People of the Web were obsessed blindly by beauty.

"How could you possibly call all this 'destruction'?" he asked her ironically.

"But it *is*."

He nodded wistfully.

"How many examples of Chaos have you made here?" she demanded.

"Six hundred and sixty odd. This world has been my oyster. I have been its irritant. And here are the wonderful pearls. It's time for me to leave, before I become irritated myself."

"You don't need any exit visa from me."

"No; but I need someone to say goodbye to. Someone who knows."

"So where will you go?"

"I've heard of a Beautyworld somewhere in Ursa Major, where they sculpt the living environment itself. Perhaps I shall go there. The first ship out will carry me in the right direction—I feel it in my bones."

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And without another word he went skipping down the web.

The Procurator drew herself up painfully and stared across Great Web for a long time, sick with the beauty of it.

At last, clasping all three sets of hands across her undershell, she let herself fall down, down, down.

She had, as they put it among the People, lost her grip.

A century later a solitary space yacht hove into orbit for a while around the world of the aesthetically inclined People of the Web. Under viewer magnification the world was a wonderful confection. It was also uninhabited.

"Perfection is Chaos," announced Tustian to the flight recorder. He owned his own yacht now. It went, at random, where he chose.

He took a blue shell equipped with a lens, held it to his eye and began to will Chaos to form inside it. And of course Chaos had no form. Yet it was a new and different Chaos, for all that.

There was only one universe. Even though it was a dauntingly large universe, it could not hold out forever. Tustian was a patient person.

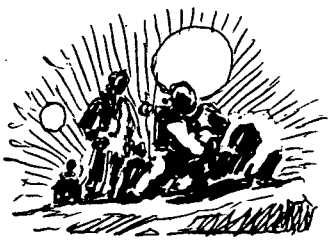
On impulse he took the newly completed Chaos over to the disposal chute. He ejected it out into space, down towards the surface of the world. He didn't imagine it would burn up or burst on impact—there was too much pressure of loveliness down there.

He shook his head in mild annoyance.

"Gilding the lily, that's all!"

Yet he felt sentimental about his many decades—or local hexades—on that world.

Later, the yacht pulled out of orbit and set course towards some other world which would give Tustian a further lease of life—and be repaid with the Midas gift: the perfect artistic touch.



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PARALLEL PASTS
by Martin Gardner

The puzzle this time around is not at all mathematical—well, almost . . .

You may recall from a few issues back how Alexander Graham Cracker and his curvy assistant, Ada Loveface, tested Cracker's theory that an infinity of parallel universes flourish side by side like the pages of a book. Cracker's parallel-world machine was capable of moving half a centimeter along the fourth spatial coordinate to the "next" universe—a universe almost (but not quite) exactly like our own.

The reason Cracker and Ada failed to encounter their twins when they entered the next world was that their doubles had just left it in their own machine. Of course no sooner had Cracker and Ada gone, so to speak, from page n to page $n + 1$, than their doubles from $n - 1$ appeared in their n laboratory. When Cracker and Ada returned to n, all the pairs simultaneously shifted back to their original worlds.

After another year of intensive research, Cracker improved his machine so that he could visit any desired spot on an adjacent earth at any time in its parallel past. For his first test he decided to go back two decades to 1981.

"In '81," said Cracker, pointing a finger, "there was a television set over in that corner. It was an old-fashioned color set with a flat picture. We won't even have to leave the lab to check on 1981 in $n + 1$. We'll just watch some $n + 1$ television programs and see if we can observe any significant differences between our past and that of the world we'll be in."

Cracker and Ada twisted their bodies into the small machine. Cracker adjusted the dials and a moment later they untwisted themselves into the newer and cleaner lab of 1981. Fortunately no one was in the room at the time. The old television set was there, just as Cracker has said. Ada switched it on.

Johnny Carson was chatting with Mickey Rooney. "You've been in the show business ever since you were a small lad," said Carson. "And you've worked with dozens of big stars. In fact, you were once married to one—Ava Gardner. Who's the lady star you've most enjoyed working with?"

"Oh, that's hard to say," replied Mickey. "They were all so won-

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derful. Of course I loved working with Judy. Judy was great. But they were all great. I loved them all."

"Is it possible," said Cracker, "that our machine is still in our own spacetime? Are we back in our own past?"

Ada's red hair swirled as she shook her head. "Impossible!" she exclaimed. "You can be sure that those two on the screen are not *our* Johnny and Mickey. Didn't you listen to their conversation?"

What had Ada heard that convinced her they were in the past of a parallel world? The answer is on page 53.

FASHION PLAIT

Saturn has rings
(Quite remarkable things,
As scientists frequently tell us).
Now pictures proclaim
She has braided the same.
Won't the other ringed planets be jealous?

—Beverly Grant

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ON COINCIDENCES IN NATURE AND THE HUNT FOR THE ANTHROPIC PRINCIPLE

by Bernard Carr & Tony Rothman
art: Leo Summers

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This article is about some important numbers and some curious relationships between them. While the numbers are exact, the relationships are not. Throughout the discussion we speak in "orders of magnitude." Factors of two and five are totally insignificant, and even factors of ten are only marginally troublesome. If an answer is off one hundred times or one thousand, then we start to pay closer attention. Therefore, the diligent reader may lay aside his pocket calculator and relax; nobody will be checking his figures to seventeen decimal places.

Man is the measure of all things. This well-known dictum was first pronounced over two thousand years ago by the Greek Sophist, Protagoras. It is not surprising that a Greek should be responsible for the sentiment; one has only to recall the figures of Zeus, Apollo, and the rest of the Olympic pantheon to recognize the face of Man in god. For the first time in the history of civilization, Man had created gods in his own image. The Greeks clearly placed Man atop a high pedestal.

Consider another dictum: The Universe exists independently of Man's awareness of it. This statement is the fundamental tenet of mechanism. It is a far cry from the Greek view of the world, but it is this mechanistic view which has led physics to be the most suc-

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cessful of all sciences. In its formulation of quantum theory, to describe small-scale phenomena, and general relativity theory, to describe large-scale phenomena, physics has provided the two fundamental edifices upon which our model of physical reality is built. Yet one feature which is noticeably absent from this model is its creator—Man himself. That physics has little to say about the place of Man in the Universe is perhaps not surprising when one considers the fact that most physicists probably regard Man—and more generally consciousness—as being entirely irrelevant to the functioning of the Universe. He is no more than a passive observer, a mere speck in a galaxy which is itself only a speck in a Universe filled with billions of galaxies. The laws of the Universe, which he assiduously attempts to unravel, operate everywhere and for all time—independent of whether Man witnesses them. Thus, energy is conserved whether Man exists or not; stars shine whether Man exists or not; any large-scale or small-scale feature of the Universe would be unaffected if Man ceased to exist altogether.

But let us think a moment about this vast, impersonal, mechanistic Universe. Let us ask the child's question, "Why is the Universe as big as it is?" Most cosmologists would respond with the following mechanistic sort of answer: "The Universe began with a Big Bang and is expanding (that is, all the galaxies are moving away from each other under the impetus of the original explosion). At any particular time, the size of the observable Universe is the distance travelled by light since the Big Bang or, roughly speaking, the age of the Universe multiplied by the speed of light. Since the Universe's present age is about ten billion (10^{10}) years, the present diameter is about ten billion light years." Inherent in this straightforward answer is the belief that there is no compelling reason the Universe has a diameter of ten billion light years; it just happens that the Universe is ten billion years old.

There is, however, another answer to this question, an answer Protagoras might have liked better. Robert Dicke, of Princeton University, first gave it twenty years ago. "The Universe," he said, "must have aged sufficiently for there to exist elements other than hydrogen, since it is well-known that carbon is required to make physicists." The carbon of which Dicke speaks, as well as many other elements, is produced by cooking inside stars. This process takes several billion years. Only after this time can the star explode as a supernova, scattering the newly-baked elements throughout space, where they may eventually become part of life-evolving planets. So we see that to produce life, the Universe must be at least

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several billion years old. Furthermore, the Universe cannot be much older than this, else all the material would have been processed into stellar remnants and man would have vanished from the scene.

Why then is the Universe as big as it is? Because if it were much smaller or larger, we wouldn't be here to observe it. This startling conclusion turns the mechanistic answer on its head. The very hugeness of the Universe which seems at first to point to Man's insignificance is actually determined by his existence. This is not to say that the Universe *itself* could not exist with a different size, only that we would not be aware of its existence when its size was different.

By this argument, at least one feature of the Universe—its size—is very much dependent on the awareness of Man. We seem to have rediscovered something of the Greek point of view. Perhaps Man is indeed necessary to explain certain features of the Universe. It is appropriate that this conjecture has become known as the "anthropic principle."

Admittedly, if the above argument were the only one in favor of the anthropic principle, it would not be very compelling. After all, it could be just a *coincidence* that the age of the Universe happens to be about the time required to produce life. However, we will see that many other features of the world can be accounted for by invoking the anthropic principle, features which would otherwise have to be regarded as purely fortuitous. Indeed, the evidence for the anthropic principle rests almost entirely on the large number of "coincidences" which seem to be prerequisites for the emergence of life. These coincidences are not those of the ordinary type which we experience daily, such as picking up the phone in order to call a friend and finding him already on the line, having decided to call you at the same instant. Rather, what has set the physicist on the hunt for the anthropic principle are coincidences which involve the very constants of nature themselves.

In order to make clear exactly what the anthropic principle claims to explain, it is necessary to present a brief outline of the physicist's worldview. Physics claims that the structure of the world is determined by various fundamental constants: for example, the speed of light (c); Planck's constant ($\hbar$), which plays a crucial role in quantum theory; the gravitational constant (G); the charge of the electron (e), which happens to equal the charge on the proton; and the masses of the various elementary particles like the proton (m_p) and the electron (m_e). Thus, $\hbar/m_pc$, which is about 10^{-13} centimeters, specifies

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the size of a proton; and $\hbar^2/m_e e^2$, which is about 10^{-8} centimeters, specifies the size of an atom.

By making other combinations of the fundamental constants, we can form "pure numbers," that is, combinations in which all the units of length, mass, and time have cancelled out. For example, the so-called "fine structure" constant, $\alpha = e^2/\hbar c$, is about 1/137. For our purposes, the fine structure constant can be thought of as determining the strength of the electromagnetic interaction. It plays a crucial role in any situation where electromagnetism is important. Another important dimensionless number is the "gravitational fine structure" constant, $\alpha_G = Gm_p^2/\hbar c$, which is about 5×10^{-39}. This constant, in analogy to the fine structure constant, determines the strength of the gravitational interaction, and plays an important role in determining the structure of very large objects (like stars). The fact that the gravitational fine structure constant is so much smaller than the fine structure constant reflects the fact that the gravitational force between two protons is so much smaller than the electromagnetic force between them. Gravity dominates the structure of large bodies only because large bodies tend to be electrically neutral so that all the electric forces cancel out. (All the above constants, with their approximate numerical values, are displayed in the accompanying table for easy reference.)

A remarkable prediction of straightforward physics is that, to an order of magnitude, the fine structure constant and the gravitational fine structure constant determine the mass and size of nearly every naturally occuring object in the Universe. For example, one can predict that all stars will have a mass of roughly $1/(\alpha_G^{3/2})$ times the mass of the proton. (Note to the nonmathematical reader: A fractional exponent like $x^{3/2}$ simply means "the square root of x-cubed." A negative exponent, like x^{-2} simply means $1/x^2$. Thus, the expression $1/(\alpha_G^{3/2})$ is more conveniently written as $\alpha_G^{-3/2}$. We will use the notations interchangeably.) Now, this fact was observed to be true long before the prediction was here to explain it. Physicists at the time were so startled by this seeming coincidence that at least one elaborate cosmological theory was invented as an explanation. We now know it is not a coincidence.

Similar physical reasoning leads to the predictions that the largest planets, like Jupiter, will have a mass which is smaller than the mass of star by the factor $\alpha^{3/2}$; the typical mass of a galaxy will be roughly α^4/α_G^2 times the proton mass; and the mass of man himself—assuming that he must live on a planet with a suitable temperature and atmosphere, and that he should not shatter whenever

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he falls down—will be of order $(\alpha/\alpha_G)^{3/4}$ times the proton mass.

These dependencies, and others, allow one to predict several amusing relationships between the different scales of structure in the Universe. For example, the mass of a man is the geometric mean between the mass of a planet and the mass of a proton; the size of a man is the geometric mean between the size of a planet and the size of an atom; the size of a planet is the geometric mean between the size of an atom and the size of the Universe. (The geometric mean of two numbers, x and y, is defined to be $(xy)^{1/2}$.)

It should be stressed, however, that such relationships, as well as the dependencies on the fine structure constant and the gravitational fine structure constant from which they derive, should *not* be regarded as coincidences. Nor do they involve the anthropic principle (except insofar as we have invoked various life supporting conditions to determine the scale of man). They are merely necessary and logical outcomes of conventional physics, and the fact that we observe these relationships to approximately hold in the real Universe is then no longer unexpected. One can understand these dependencies qualitatively as follows: The existence of any stable structure in the Universe reflects a balance between the various forces of nature. On scales larger than atoms, the only important forces are gravity, electromagnetism, and the quantum mechanical "exclusion principle" force. Since the constant G is fundamental to gravity, e to electromagnetism, and $\hbar$ to quantum forces, one would expect them to be present in an equation which purported to balance them off. Furthermore, balances are reflected by ratios: "Force A is three times as strong as force B. The ratio between their strengths is 3, a dimensionless number." Since the fine structure constant and the gravitational fine structure constant are the only dimensionless numbers which can be constructed from G, e, and $\hbar$—along with c, the speed of light—it is not too surprising to find them surfacing in the sort of results presented here. There is, however, no *a priori* way of knowing which powers of the two fine structure constants will appear in the expressions for the various scales. They just have to be calculated.

As mentioned above, we have not used any property of man in our arguments except his atmospheric requirements and his vulnerability to breakage. Let us make the anthropic connection by returning to the question which began this article: "Why is the Universe as big as it is?" Instead of asking this precise question, we are going to ask a different one which at first might seem only

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distantly related. We are going to ask for the explanation of a very famous cosmological coincidence. That is, why is the ratio of the size of the observable Universe to the size of an atom roughly the same as the ratio of the electromagnetic to gravitational force between protons? It may be helpful to write this coincidence down in symbols in order to visualize it:

$$\frac{ct}{a} \text{ is about } \frac{\alpha}{\alpha_G}.$$

As mentioned at the beginning of the article, the size of the Universe is just ct; or the speed of light multiplied by the age of the Universe. Here, a is the size of an atom, and α and α_G have already been discussed at length. Although the size of each of these ratios is too enormous to be readily conceived, of order 10^{37}, they both happen to be nearly the same. This is a genuine coincidence. We believe we know the approximate age of the observable Universe; we can measure the values of the fundamental constants in the laboratory. They seem to have no connection with one another. Why then should these two ratios be so closely the same? Known physics cannot provide the answer.

One may feel compelled to explain a remarkable coincidence, or may dismiss it as unimportant. The great physicist, Paul Dirac, felt compelled to explain it. He suggested that the gravitational constant, G, which appears above in α_G, is not really a constant at all but decreases as the Universe expands in such a way that the coincidence remains true at all times. Dirac's theory, unfortunately, seems to be inconsistent with observational evidence and thus must be discarded.

There is another explanation for this famous coincidence: it is Dicke's original anthropic argument. Recall he said that the age of the Universe (t in our "equation") must be roughly the nuclear burning time of a star, which is about 10^{10} years, in order for life to exist. Now, conventional physics predicts that this lifetime of a star is of order $1000/\alpha_G$ multiplied by the time required for light to travel across a proton, which is itself $\hbar/m_pc^2$. (To keep ourselves reasonably honest, we should mention that the exact lifetime of a star varies considerably with its mass.) If the reader wishes to go to the trouble of writing our coincidence in terms of these numbers, with the size of an atom taken to be $\hbar^2/m_ee^2$, as mentioned earlier, he will find the coincidence closely satisfied. That is, the assumption that the Universe must be old enough so that Man exists, forces this coincidence to be approximately true.

The anthropic principle can also explain another well-known cos-

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mological coincidence. General relativity predicts that the number of particles which we can observe in the Universe increases with time as the Universe expands. It was long ago noted that the number of observable protons in the Universe is roughly $1000/\alpha_G^2$, or 10^{80}. The question is: if the number of observable protons changes with time, why should the number we see be so neatly related to the gravitational fine structure *constant*? Again, the answer lies outside of conventional physics. And again, the anthropic principle can provide a possible solution. If, as above, we assume that the Universe must be as old as the stars for life to exist, and this age is approximately $1000/\alpha_G$ multiplied by the light travel time across a proton, it is easy to show that the number of protons we should observe in the Universe is indeed $1000/\alpha_G^2$, or 10^{80}, as long noted.

Dicke's statement of the anthropic principle might be termed the "weak" version. It says nothing about the laws of physics themselves nor anything about the actual sizes of the fundamental constants. It accepts the laws and the observed values of the constants as given and then attempts to explain several well-known coincidences. We are now going to explore the deeper question of whether anthropic arguments can pin down the values of the natural constants themselves. The notion that this may be possible is sometimes referred to as the "strong" anthropic principle. The strong principle is so called because—if true—it would obviously have much more predictive power and philosophical significance than the weak principle invoked by Dicke.

That the weak principle may not be the whole story is also suggested by the fact that all the scales discussed above are *relative*. If the fine structure constants differed from what we observe them to be in the laboratory, all the scales would change but the basic relationships would remain the same. For example, if the gravitational constant—and hence the gravitational fine structure constant—were a million times larger, planetary and stellar masses—which go like $1/\alpha_g^{3/2}$ —would be a billion times smaller. However, there would still be stars, albeit with a nuclear burning time reduced by a factor of a million. Moreover, Dicke's argument would still apply: an observer in such a universe would exist only when its age was about 10,000 years and he would see a universe whose mass was 10^{12} times smaller than our own! If one fixed the gravitational fine structure constant but allowed the fine structure constant to change, the effects would be less extreme but still very observable. But could life arise in such a speeded-up universe? Nei-

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ther conventional physics nor the weak anthropic principle has anything to say about the matter; nothing determines the actual values of the fine structure constants. But the strong principle says, "No! Life exists if and only if the fundamental constants have their observed values."

The first example of an argument which appeals to the strong anthropic principle was given by Brandon Carter and relates to the existence of what are called "convective" stars. We say a star is convective when the heat generated in its core by nuclear reactions is transported to the surface primarily by way of large-scale motions of the stellar material itself. This tends to be the case for small enough stars (red dwarfs). By contrast, larger stars (blue giants) tend to be "radiative" in the sense that the heat generated gets out primarily via the flow of radiation. The dividing line between the two types is some critical mass which depends on the two fine structure constants. This critical mass could in principle be anything, depending on the numerical values of the gravitational fine structure constant and the fine structure constant. But it happens to lie in the mass range in which stars actually exist, around $\alpha^{-3/2}_G$ times the proton mass, *only* because of the remarkable coincidence that the gravitational fine structure constant is of order the *twentieth* power of the fine structure constant ($\alpha_G \sim \alpha^{20}$). If the gravitational fine structure constant were slightly smaller, all stars would be radiative; if it were slightly smaller, all stars would be convective. Now, there are arguments which suggest that planets can only form around convective stars. If we believe that life can only exist on planets, this means that α_G cannot be much larger than α^{20}. On the other hand, if α_G were much smaller than α^{20}, all stars would be chemically well-mixed as a result of convection. Such stars would probably not form supernovas and hence could not scatter the heavy elements needed for life into space. Thus, the anthropic principle already gives us one approximate relationship between the two fine structure constants. In particular, it explains why the gravitational fine structure constant is so much smaller than the fine structure constant.

The fact that the gravitational fine structure constant is so much smaller than the fine structure constant has another anthropic interpretation. We have mentioned that the mass of a star is about $\alpha^{-3/2}m_p$. One can also show that the mass of the observable Universe is roughly $1000\alpha_G^{-2}m_p$. Together, these relationships show the number of stars in the Universe to be about $1000\alpha_G^{-1/2}$. If one assumes that the origin of life depends on chance processes which have a low

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a priori probability, one evidently wants the number of potential sites of life (e.g., the number of stars) to be very large. This, from above, requires the gravitational fine structure constant to be very small, although the argument does not say how small. It is also interesting to note—but we will not prove it—that if α_G is of order α^{20}, then the number of stars in a galaxy is the same as the number of galaxies in the Universe.

The convective star condition does not pin down the actual values of the fine structure constants; it only specifies a scaling law between them. If we had one more such relationship, we could predict a unique value for each ("two equations, two unknowns"). Another relationship does in fact exist. It does not come from an anthropic argument but from an argument in quantum field theory. While the details are far too complicated to go into here, the conclusion is that a self-consistent quantum field theory is possible only if $1/\alpha$ is of the order of the natural logarithm of $1/\alpha_G$. This relation, together with the convective star condition, implies that α must be about 10^{-2} and α_G must be about 10^{-40}, approximately what is measured. In view of the simple dependence on the fine structure constants of the different scales of structure in the Universe, this suggests that the appearance of our Universe is determined, not merely in part, but to a very large extent by our existence.

So far we have talked about things larger than atoms. We now divert our attention to objects smaller than atoms. On this scale, two more fundamental forces of nature come into play: the *strong* force (which holds the nucleus of an atom together) and the *weak* force (which governs radioactive decay). Like gravity and electromagnetism, the strength of these forces can be described by dimensionless fine structure constants: the strong force constant is denoted by α_S and has a value of about 15; the weak force constant is denoted by α_W and has a value of order 10^{-10}. Although the strong and weak forces are many orders of magnitude stronger than the gravitational force, they are both very short range. The strong force becomes negligible outside a distance comparable to the size of a proton, 10^{-13} centimeters. The weak force becomes negligible at an even shorter distance, around 10^{-15} centimeters. For this reason the strong and weak forces do not play an important role in determining the structure of objects larger than atoms. This role is left to the long-range forces of gravity and electromagnetism.

The strong and weak fine structure constants are also involved in several coincidences, some of which involve the masses of various

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elementary particles. For example, we observe the ratio of the strong fine structure constant to the electric fine structure constant (α) to be roughly the ratio of the proton mass to the electron mass. Also, we measure the difference between the mass of the neutron and the mass of the proton to be very nearly twice the electron mass. The striking thing is, that these and other nuclear coincidences seem necessary for life. Were things otherwise, there could not exist the variety of chemical elements necessary for our existence. Indeed, given that the fine structure constant, α, is anthropically determined, the nuclear anthropic conditions are sufficient to determine not only the strong fine structure constant, α_s, but also most of the elementary particle masses.

The weak force does not at first sight seem to play a very important role in everyday life. Yet, the weak fine structure constant, α_w, is also involved in an interesting anthropic relationship: the weak fine structure constant is roughly the quarter power of the gravitational fine structure constant ($\alpha_G \sim \alpha_W^4$). This relationship is just what is needed to produce an interesting amount of helium through cosmological nucleosynthesis several minutes after the Big Bang when the Universe was hot enough and dense enough for nuclear reactions to occur. If the weak fine structure constant were slightly smaller, the entire Universe would have burned to helium and there would not have been any water—another possible prerequisite for life. If the weak fine structure constant were slightly larger, there would be *no* helium in the Universe. Although a Universe lacking in helium might not be incompatible with life, the same relationship between the weak and gravitational fine structure constants is associated with another condition which limits the size of the weak constant in *both* directions. It turns out that the fact that α_G is of order α_W^4 may be necessary to explain why the flux of neutrinos from the core of a star can blow off its envelope during its supernova phase. As we have seen, supernovas play a crucial role in producing the elements necessary for life. So, if we accept that α_G must be α_W^4 for life to arise, and if we believe from our previous arguments that α_G is determined anthropically, we must also accept that α_W is so determined.

To summarize the entire collection of results is simple: nearly *all* the constants of nature may be determined by the anthropic principle. But what are we to make of all this? Are we to be impressed by the anthropic principle's explanation of the aforementioned coincidences, or are we to discard it as a metaphysical curiosity? Let

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us start by listing the objections. Firstly, all the evidence is after the fact. It would be much more impressive if the anthropic principle could be used to *predict* a coincidence, but so far this has not been done. Secondly, we may have been unduly anthropocentric in our point of view. We have assumed the necessity of element heavier than hydrogen and special types of stars and planets. We have not taken into account the possibility of more exotic life forms, such as Fred Hoyle's Black Cloud, which existed in interstellar space. In order for such exotic life forms to be consistent with our anthropic arguments, we would have to show that its chemistry and environment required the same values for the fundamental constants as we deduced above. Otherwise, the scope of the anthropic principle would have to be extended. Finally, the anthropic principle does not give *exact* values for the constants, but only their orders of magnitude. Some would argue that, given the range in size of the numbers involved, almost any combination can be produced and the anthropic principle is nothing more than numerology. The situation would indeed be more satisfactory if the values of the constants could be pinned down with greater accuracy.

Nonetheless, it cannot be denied that there are a number of remarkable coincidences in nature and these do warrant some sort of explanation. The point is not that there are coincidences, but that these coincidences are just what is required for life. It is this deeper level of coincidence which makes the anthropic principle so striking. Of course, where arguments are based on the existence of coincidences, the weight of evidence rests very strongly on the *number* of coincidences. Thus, the future status of the anthropic principle as an explanation of certain features of the Universe will depend on the number of further anthropic relations which are discovered.

There remains the interpretation of the anthropic principle. From the start we admit that most physicists would be reluctant to take its metaphysical concepts too seriously. On the other hand, in grappling with the problems of consciousness, one is pushing physics to its limits. And when one pushes physics to its limits, it is probably inevitable that one will encounter a border where physics merges with metaphysics. It is at this border we find the anthropic principle. It is no wonder that most physicists are reluctant to approach this frontier. But more and more distinguished researchers are joining the ranks of those who are willing to consider the anthropic principle seriously. Not only Robert Dicke and Brandon Carter, both highly respected relativists, but Dennis Sciama who has fathered many

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ideas as well as the careers of Roger Penrose and Stephen Hawking, has expressed support for the anthropic principle. Freeman Dyson, in his moving chapter "The Argument From Design," from his book *Disturbing the Universe* writes:

> I conclude from these accidents of physics and astronomy that the universe is an unexpectedly hospitable place for living creatures to make their homes in. Being a scientist trained in the habits of thought and language of the twentieth century, rather than the eighteenth, I do not claim that the architecture of the universe proves the existence of God. I claim only that the architecture of the Universe is consistent with the hypothesis that mind plays an essential role in its functioning.

John Wheeler, who is responsible for many advances in the physics of this century, perhaps the least of which was the introduction of the term "black hole" into the English language, holds a similar, if not more extreme view. Recall, we have not claimed the Universe does not exist if we are not here to observe it; we have only stated that, *if* we *are* here to observe it, the Universe must be the way we see it. Wheeler, on the other hand, has suggested a much more radical interpretation. In Wheeler's picture, the Universe cannot come into being in a well-defined way unless an observer is produced who can eventually observe it. In this case, the existence of the Universe itself depends upon life.

Although many find Wheeler's solipsistic standpoint unpalatable in view of its rather mystical overtones, there is another framework for the anthropic principle which might seem more plausible. This is the "Many Worlds" interpretation of quantum mechanics, proposed nearly 20 years ago by Hugh Everett. One of the underlying features of quantum theory is that a system is not in a well-defined state until one makes a measurement or observation on it. Prior to the measurement, the system—which might in principle be the entire Universe—is in an undefined, fuzzy state. It is not in one state or another but in a sort of combination of states, what we call a *superposition* of states. It takes an act of measurement or observation to force the system into a particular one. Quantum mechanics allows one to predict the probability that the measurement will have a specific outcome, but it does not determine the result with certainty.

This concept is very strange and leads to apparent paradoxes in some situations. The most famous of these is the "Schrodinger Cat Paradox." A cat is imprisoned in a box. Also in the box is an atom of a radioactive element with a half-life of one hour, a geiger counter,

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TABLE OF FUNDAMENTAL CONSTANTS AND OTHER IMPORTANT NUMBERS

SYMBOL	NAME	SIGNIFICANCE	VALUE IN CGS UNITS (APPROXIMATE)
c	speed of light		3×10^{10} cm/s
$\hbar$	Planck's constant	governs scale of all quantum phenomena	1×10^{-27}gm cm^2/sec
G	gravitational constant	governs strength of gravitational force	7×10^{-8} cm^3/gm/sec^2
m_p	mass of the proton	--	2×10^{-24}gm
m_e	mass of the electron	--	9×10^{-28}gm
e	charge of the electron or proton	--	5×10^{-10}(gm cm^3/sec^2)$^{1/2}$
$r_p = \hbar/m_p c$	Compton wavelength of proton	roughly the size of the proton	10^{-13} cm
$t_p = \hbar/m_p c^2$	proton timescale	time for light to travel across a proton	10^{-23} sec
$a = \hbar^2/m_e e^2$	Bohr radius	roughly the size of an atom	10^{-8} cm
$\alpha = e^2/\hbar c$	fine structure constant	governs strength of electric force between two protons	1/137
$\alpha = Gm_p^2/\hbar c$	gravitational fine structure constant	governs strength of gravitational force between two protons	5×10^{-39}
α_S	strong force fine structure constant	governs strength of strong nuclear force	15
α_W	weak force fine structure constant	governs strength of weak nuclear force	10^{-10}

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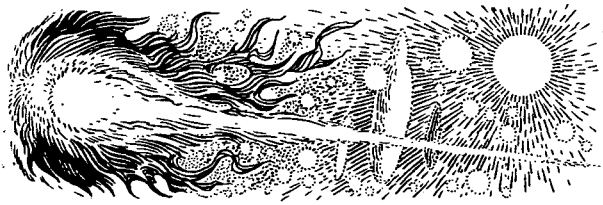
and a vial of poisonous gas. If the geiger counter finds that the atom decays during the hour of the experiment, it releases the gas and kills the cat; otherwise, the cat survives. By the definition of half-life, after one hour there is exactly a fifty-fifty chance that the cat will have been killed. Now, in quantum mechanics, the equation which describes the state of the cat at the end of the hour only does so in a fuzzy way. It says that, until someone looks inside the box, the cat is made of fifty percent live cat and fifty percent dead cat. Everett resolves this paradox by saying the Universe splits in two. In one Universe there is a live cat, in the other a dead cat.

The same idea can be extended to any other observations, even when there are more than two outcomes. One envisages a Universe which splits whenever an observation is made. Each split corresponds to a possible outcome of the observation. The Universe is continually branching: cats live, cats die, wars break out, wars are averted. All worlds differ by a decision or a cat. Perhaps, in addition, some worlds differ in the values of their fundamental constants. In some universes α is big, in others, α is small. Only in a tiny fraction of these many worlds will the values be such that life can evolve. On these worlds intelligence flowers and becomes aware of itself. On these worlds men may develop an anthropic principle to explain their existence. On other worlds, life will never evolve and the questions will never be asked.



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I AIN'T TOO DUMB TO CARE

I guess, Dorothy,
It comes down to
This:
You can take your goddam dog,
And go;
But I
've lived too long in Oz
To believe in Kansas—
Much.

The Lion curls in the corner
Like a golden question
Mark.
Metal head holds your basket and weeps.
But I've already fallen a hundred times;
I don't have any other
Tricks.

Everyone says I'm not very wise.
Just the same, Glinda has the eyes
Of a liar.
And if she isn't, I still don't see
Why you'd trust to a pair of shoes instead of a rainbow.
Depends, I suppose, on where you
Want to go.
But I want you to know—
It burns like fire.

—Jon P. Ogden

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THE ANATOMY LESSON

by Scott Sanders

art: George Barr

The author is 35, a carpenter and mountain climber who makes his living as a teacher. He hunts wildflowers—but does not pick them—and stalks elusive birds and listens to owls. His first SF novel, Terrarium, *is with his agent, Virginia Kidd.*

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By the time I reached the Anatomy Library all the bones had been checked out. Students bent over the wooden boxes everywhere, in hallways and snack-bar, assembling feet and arms, scribbling diagrams in notebooks. Half the chairs were occupied by slouching skeletons, and reclining skeletons littered the tables like driftwood. Since I also would be examined on the subject the next day, I asked the librarian to search one last time for bone-boxes in the storeroom.

"But I tell you, they've all been given out," she said, glaring at me from beneath an enormous snarl of dark hair, like a fierce animal caught in a bush. How many students had already pestered her for bones this evening?

I persisted. "Haven't you got any damaged skeletons? Irregulars?"

Ignoring my smile, she measured me with her fierce stare, as if estimating the size of box my bones would fill after she had made supper of me. A shadow drooped beneath each of her eyes, permanent sorrow, like the tearmark of a clown. "Irregulars," she repeated, turning away from the counter.

I blinked with relief at her departing back. Only as she slipped noiselessly into the storeroom did I notice her gloved hands. Fastidious, I thought. Doesn't want to soil herself with bone dust and mildew.

While awaiting my specimens, I studied the vertebrae which knobbed through the bent necks of students all around me, each one laboring over fragments of skeletons. Five lumbar vertebrae, seven cervical, a round dozen thoracic: I rehearsed the names, my confidence building.

Presently the librarian returned with a box. It was the size of an orange crate, wooden, dingy from age or dryrot. The metal clasps that held it shut were tarnished a sickly green. No wonder she wore the gloves.

"This one's for restricted use," she announced, shoving it over the counter.

I hesitated, my hands poised above the crate as if I were testing it for heat.

"Well, do you want it, or don't you?" she said.

Afraid she would return it to the archives, I pounced on it with one hand and with the other signed a borrower's card. "Old model?" I inquired pleasantly. She did not smile.

I turned away with the box in my arms. The burden seemed lighter than its bulk would have promised, as if the wood had dried with age. Perhaps instead of bones inside there would be pyramids of dust. The metal clasps felt cold against my fingers.

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After some searching I found a clear space on the floor beside a scrawny man whose elbows and knees protruded through rents in his clothing like so many lumps of a sea serpent above the waters. When I tugged at the clasps they yielded reluctantly. The hinges opened with a gritty shriek, raising for a moment all round me a dozen glazed eyes, which soon returned to their studies.

Inside I found the usual wooden trays for bones, light as birdwings; but instead of the customary lining of vinyl they were covered with a metal the color of copper and the puttyish consistency of lead. Each bone fitted into its pocket of metal. Without consulting notes, I started confidently on the foot, joining tarsal to metatarsal. But it was soon evident that there were too many bones. Each one seemed a bit odd in shape, with an extra flange where none should be, or a socket at right angles to the orthodox position. The only way of accommodating all the bones was to assemble them into a seven-toed monstrosity, slightly larger than the foot of an adult male, phalanges all of the same length, with ankle-bones bearing the unmistakable nodes for—what? Wings? Flippers?

This drove me back to my anatomy text. But no consulting of diagrams would make sense of this foot. A practiced scrape of my knifeblade assured me these were real bones. But from what freakish creature? Feeling vaguely guilty, as if in my ignorance I had given birth to this monstrosity, I looked around the library to see if anyone had noticed. Everywhere living skulls bent studiously over dead ones, ignoring me. Only the librarian seemed to be watching me sidelong, through her tangled hair. I hastily scattered the foot bones to their various compartments.

Next I worked at the hand, which boasted six rather than seven digits. Two of them were clearly thumbs, opposite in their orientation, and each of the remaining fingers was double-jointed, so that both sides of these vanished hands would have served as palms. At the wrist a socket opened in one direction, a ball joint protruded in the other, as if the hand were meant to snap onto an adjoining one. I now bent secretively over my outrageous skeleton, unwilling to meet stares from other students.

After tinkering with fibula and clavicle, each bone recognizable but slightly awry from the human, I gingerly unpacked the plates of the skull. I had been fearing these bones most of all. Their scattered state was unsettling enough to begin with, since in ordinary skeletal kits they would have been assembled into a braincase. Their gathered state was even more unsettling. They would only go together in one arrangement, yet it appeared so outrageous to me that

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I forced myself to reassemble the skull three times. There was only one jaw, to be sure, though an exceedingly broad one, and only two holes for ears. But the skull itself was clearly double, as if two heads had been squeezed together, like cherries grown double on one stem. Each hemisphere of the brain enjoyed its own cranium. The opening for the nose was in its accustomed place, as were two of the eyes. But in the center of the vast forehead, like the drain in an empty expanse of bathtub, was the socket for a third eye.

I closed the anatomy text, helpless before this freak. Hunched over to shield it from the gaze of other students, I stared long at that triangle of eyes, and at the twinned craniums that splayed out behind like a fusion of moons. No, I decided, such a creature was not possible. It was a hoax, a malicious joke designed to shatter my understanding of anatomy. But I would not fall for the trick. Angrily I disassembled this counterfeit skull, stuffed the bones back into their metal pockets, clasped the box shut and returned it to the counter.

"This may seem funny to you," I said, "but I have an examination to pass."

"Funny?" the librarian replied.

"This hoax." I slapped the box, raising a puff of dust. When she only lifted an eyebrow mockingly, I insisted: "It's a fabrication, an impossibility."

"Is it?" she taunted, laying her gloved hands atop the crate.

Furious, I said, "It's not even a very good hoax. No one who knows the smallest scrap of anatomy would fall for it."

"Really?" she said, peeling the glove away from one wrist. I wanted to shout at her and then hurry away, before she could uncover that hand. Yet I was mesmerized by the slide of cloth, the pinkish skin emerging. "I found it hard to believe myself, at first," she said, spreading the naked hand before me, palm up. I was relieved to count only five digits. But the fleshy heel was inflamed and swollen, as if the bud of a new thumb were sprouting there.

A scar, I thought feverishly. Nothing awful.

Then she turned the hand over and displayed for me another palm. The fingers curled upward, then curled in the reverse direction, forming a cage of fingers on the counter.

I flinched away. Skeletons were shattering in my mind, names of bones were fluttering away like blown leaves. All my carefully gathered knowledge was scattering. Unable to look at her, unwilling to glimpse the socket of flesh that might be opening on her forehead beneath the dangling hair, I kept my gaze turned aside.

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"How many of you are there?" I hissed.

"I'm the first, so far as I know. Unless you count our friend here," she added, rapping her knuckles against the bone-box.

I guessed the distances to inhabited planets, conjured up the silhouettes of space craft. "But where do you come from?"

"Boise."

"Boise, *Idaho?*"

"Well, actually, I grew up on a beet farm just outside Boise."

"You mean you're—" I pointed one index finger at her, and shoved the other against my chest.

"Human? Of course!" She laughed, a quick sound like the release of bubbles underwater. Students at nearby tables gazed up momentarily from their skeletons with bleary eyes. The librarian lowered her voice, until it burbled like whalesong. "I'm as human as you are," she murmured.

"But your hands? Your face?"

"Until a few months ago they were just run-of-the-mill human hands." She drew the glove quickly on and touched her swollen cheeks. "My face was skinny. My shoes used to fit."

"Then what happened?"

"I assembled these bones." Again she rapped on the crate. From inside came a hollow clattering, like the sound of gravel sliding.

"You're—becoming—one of them?"

"So it appears."

Her upturned lips and downturned eyes gave me contradictory messages. The clown-sad eyes seemed too far apart. Even buried under its shrubbery of dark hair, her forehead seemed impossibly broad.

"Aren't you frightened?" I said.

"Not any more," she answered. "Not since my head began to open."

I winced, recalling the vast skull, pale as porcelain, and the triangle of eyes. I touched the bone-box gingerly. "What *is* it?"

"I don't know yet. But I begin to get glimmerings, begin to see it, alive and flying."

"Flying?"

"Swimming, maybe. My vision's still too blurry. For now, I just think of it as a skeleton of the possible, a fossil of the future."

I tried to imagine her ankles affixed with wings, her head swollen like a double moon, her third eye glaring. "And what sort of creature will you be when you're—changed?"

"We'll just have to wait and see, won't we?"

"We?" I echoed, backing carefully over the linoleum.

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"You've put the bones together, haven't you?"

I stared at my palms, then turned my hands over to examine the twitching skin where the knuckles should be.

SOLUTION TO PARALLEL PASTS (from page 31)

It was Johnny Carson's first question. Nobody, but nobody, in show business in this United States, circa 1981, speaks of "the" show business.

Cracker and Ada decided not to linger in 1981. They were eager to travel to the parallel pasts of cities other than New York. Plans had already been made to visit Stratford, England, on April 23, 1616, then make a quick trip to Madrid on the same day to check on the deaths of Shakespeare and Cervantes. As is well known, both writers died on April 23, 1616. Here is how Robert Service described the coincidence in a poem:

> Is it not strange that on this common date,
> Two titans of their age, aye of all Time,
> Together should renounce this mortal state,
> And rise like gods, unsullied and sublime?
> Should mutually render up the ghost,
> And hand in hand join Jove's celestial host?

At Stratford-on-Avon, Cracker and Ada witnessed Shakespeare's funeral and burial. But when they moved to Madrid, on the same day, they discovered that Cervantes had died ten days earlier!

"I'm staggered by this disparity," said Cracker, when they were back to 2001 in the apartment they shared on 106th Street. "In view of our past experiences with parallel pasts, I would never have anticipated such a big difference."

However, as Ada later learned, the difference was greatly exaggerated. What careless mistake had they made? Turn to page 87 to find out.

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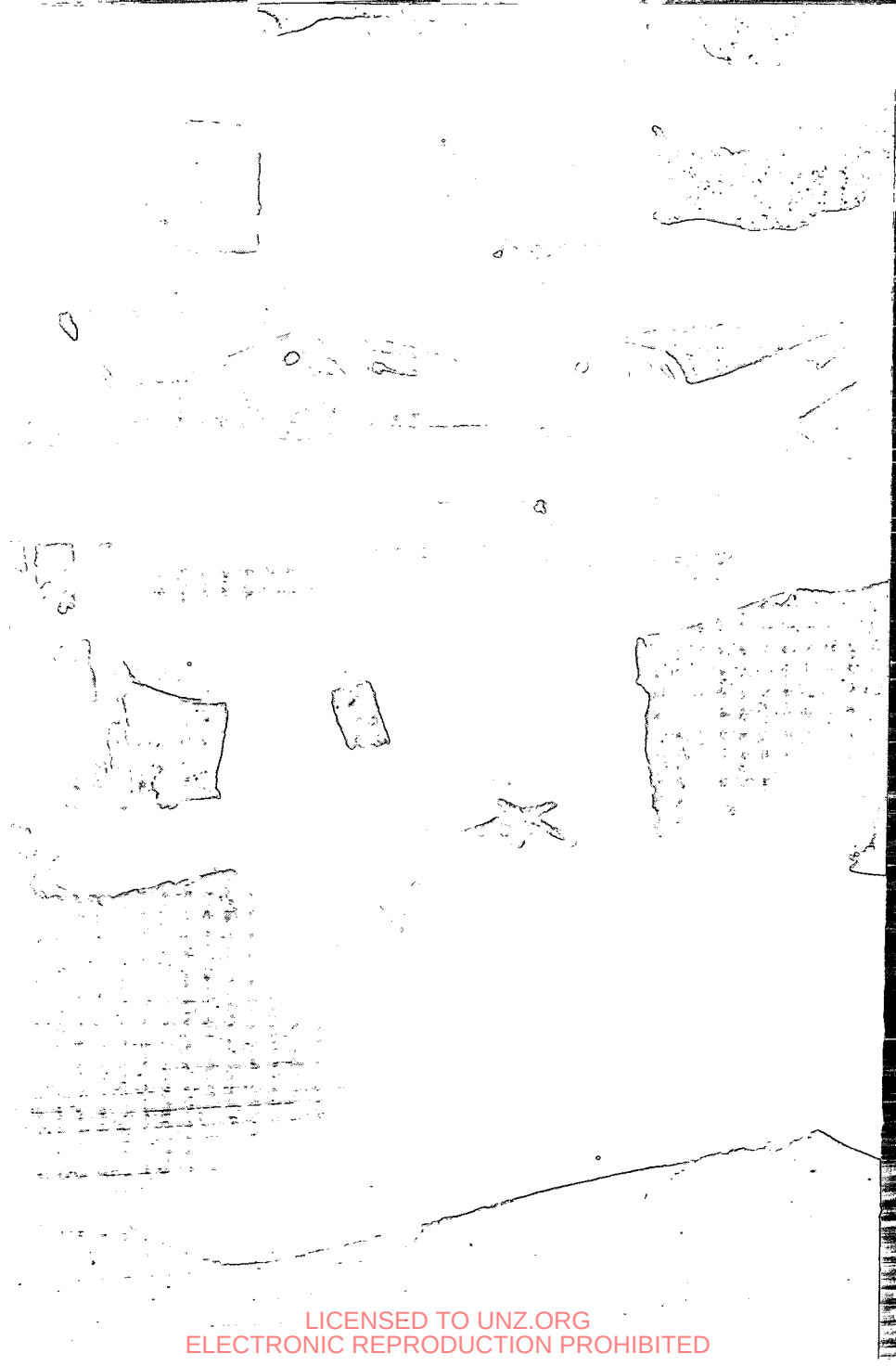

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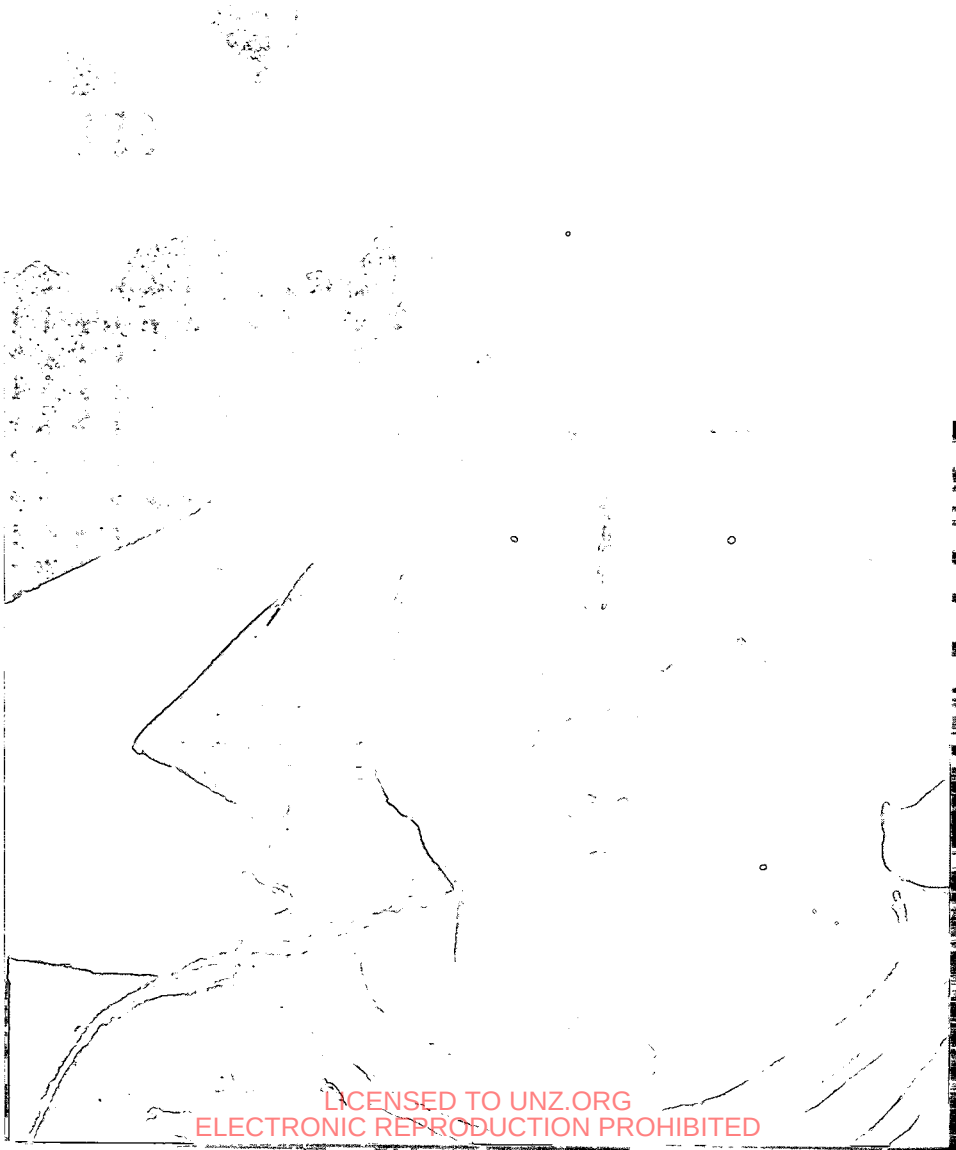
INTERSECTIONS

by John M. Ford

art: Artifact



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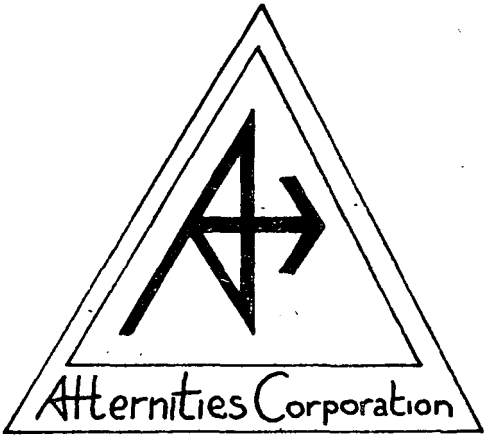

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We're building your dreams

YOUR FINEST HOUR . . .

There was a time when eagles fought. When a gallant few, suspended between heaven and earth, decided the fate of nations.

The names echo in the sky forever . . . of the machines: Fokker, Sopwith, Spitfire, Messerschmitt, Mustang . . . and the men who flew them: Guynemer, von Richthofen, Malan, Bong. . . .

Alternities Corporation invites you to that time.

NOT LINK TRAINERS. . .

Leave your arcade tokens at home. Alternities Corporation flight looks, sounds, and feels real. Because it *is* real. The sound of wind in the wires, the centrifugal pull of a combat turn, the flash of twin Spandau machine guns as the enemy jinks in your sights—these can't be counterfeited. So we didn't.

Yet it's all safer than a drive in the country—even if you've never been in an airplane. Even persons denied a pilot's license for medical reasons can fly with us.*

YOUR SKY IS WAITING . . .

There is still a time when eagles fly, in sunlight and clean cold air. Alternities Corporation knows how to find that time. Let us take you there.

Because we're building your dreams.

**For information on Hazard Ratings and flight qualifications contact your travel agent or Alternities Corporation.*

—Approved for advertising release
31 September by Ouray Center.

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Herein, Mr. Ford suggests that—just possibly—there may even be more than one Alternities Corporation . . .

Captain Roy Kramer, U.S. Army Air Corps, ran a thumb down the duty roster in the staff room, trying to remember if he was supposed to die today, and if so, how gallantly.

He found the marker: not today but next Tuesday. The squadron would lose him to flak in a raid on some Dutch bridges, and have to struggle back home, leaderless, through a gauntlet of Luftwaffe fighters.

Stupid flak, Kramer thought, *that's pretty cheap.* The German squadrons would have lots of wireheads—who else would go for that sort of barrelled fish shoot?—and the flak would cost him some easy kills. And that could end up costing him money.

He was getting tired of this war, he thought. Much as he loved pistons and propwash, he needed something faster, hotter. Maybe he'd transfer to the Fulda Gap line and gray-ghost Eagles. Or a *Bellatrix*-class starfighter in the Orion Wars.

Roy Kramer, Alternities Corporation Guide Three, turned away from the roster board and took a sip of coffee. The cup hadn't left his hand in an hour, and Kramer had lost count of refills. He looked at the cup, at the band of arrowhead-As chasing each other around the rim. On Kramer's shoulder, just below the Eighth Air Force patch, was another Alternities trademark. The symbol fluttered from the flagpole outside, under the 48-star Old Glory. They never let you forget.

> Twinkle, twinkle, Alteco,
> How I wonder where we go
> When the Homeline's left behind,
> Out of sight and out of mind.

. . . at least, not if you were staff. The paying customers always forgot. Always.

The clendar on the wall read 1944. The voices of the Andrews Sisters, or a reasonable facsimile, filtered in from another room, singing about kicking Adolf 's ass to the Moon, not in so many words, of course.

Kramer thought that he wasn't so very tired of WWII after all; maybe just the Transalpine '44 line. He could transfer to Pacific Theater and help rescue Glenn Miller for a while. That was one of

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the best of the short scenarios. A little air combat, a little exploring, a little ground action, and some great music to top it off. Miller was easily ten times as popular as Amelia Earhart, about whom the scenario had originally been written. She could only say thanks, not play it honey-smooth.

The five-minute warning chimed. Kramer tossed back the last of his coffee and picked his flight jacket from the back of his chair. He lifted the wall phone and punched a number.

"Line Local Control," the phone said.

"This is Gee-Three Kramer, Line Local. Will you verify mission as air superiority?"

There was a pause, the click of computer keys. "Verified dogfight, Roy. Know who you're up against?"

"Barnum von Richthofen and his flying circus."

"Wendy Burden. You in a gamblin' mood, Roy-boy?"

"Not any more."

"Ten bucks and a double Bushmill's says you get bounced."

"No bet." Outside, the scramble siren began to rise. "Kramer verified and out the door."

"Outside, recorded."

Kramer hung up. Tugging his jacket on, he went out of the staff room onto the field.

The air was chilly, with a slight moist breeze that ruffled the grass and stirred the flags on the pole. The sky was that strong pure blue that is only possible on cold mornings; some thin layers of cloud streaked across it, enough to make things interesting, enough for hide and seek and bounce and kill. Perfect flying weather.

It was always perfect flying weather where Alternities' pilots were. There had to be rain, of course, because there were grass and trees and a fishing pond, not to mention clouds. But the rain happened offstage, between the acts. Every now and then somebody who'd seen *The High and the Mighty* wanted to bring a big bird home in heavy weather, three engines out, and if he had the money for private line time, then it rained. And thundered and lightninged and so forth. The plane would be on the wire, naturally, and couldn't crash if you knocked the whole crew cold and threw a brick through the control board, but the staff were paid to pretend they were fighting Fate one-handed and the customer forgot, because the customers always forgot.

Kramer took a long breath through his nostrils, to clear his head. He didn't care this morning who forgot and who remembered. There was good money and clear blue sky and the most beautiful planes

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in the world. Many worlds.

Kramer's P-38G Lightning was out of the hangar, waiting for him. The ground crew was tending her, carefully as she deserved. The electrician plugged a digital meter into the diagnostic slots, checking the ignition, the avionics, the lasers—no doubt the kill-sensors and the wire system too, needed, wanted, or not. The chief mechanic tapped an oleo strut with a wrench, listened to the ring and found it good. The fuel attendant handled the hose as if it were a delicate thing, not armored and leakproof, and did not spill a drop on paint or pavement.

The dark green camouflage paint, ordered by the scenario, hid some of the machine's sleekness of line, but Kramer's eye knew the truth, tracking from the egglike nose, past the engine cowlings to either side of the cockpit, down the slender twin tail booms—a little fat in their middles, where the superchargers crouched—to the intersecting planes of the tail, sharp-flat-sharp.

The mechanic held the ladder for Kramer, and he vaulted into the cockpit, his arms and legs as fingers slipping into a fitted glove: a mail gauntlet. Kramer craned his head around, loosening his neck and scanning the other planes of his squadron, the paying guests. Then he slid the canopy shut and touched his throat mike.

"Line Local, this is G-3 Kramer. Verify squadron status."

"Squadron Leader, you are verified for a Hazard Three operation, ten patrons of eleven. Pilot Cupertino is grounded with lubricant boilover and fuel backflow."

Mr. Cupertino, paying Alternities customer, was hung over and puking his guts out. "Roger, Line Local. Drop Cobleigh back to Cupertino's slot. . . . Firing up now."

Kramer punched the starter. His engines did not cough, did not wheeze; they spat once sharply and started singing. Kramer showed the ground crew thumbs-up and they pulled the blocks from his wheels.

"Line Local, this is Kramer, verified and rolling."

"Rolling, recorded, Kramer." A pause, keys working. "About that bet, Roy . . . "

"Ten bucks, okay. But you buy your own drinks."

"Roger, wilco, Roy-boy. Don't let the bandits get you down."

No fair, Kramer thought, *wishing me luck to sour it,* but he was too busy to transmit the thought. He was on his way down the runway, feeling the road through the finely tuned suspension, watching the sky.

And then there came a last light shock, and there was no more

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road; the buzz and thump of folding wheels followed, and Kramer and his ship were no more of the ground.

He switched in the flight systems. A spot of white light glowed at the center of the plan monitor's radar map, representing his plane; ten green dots, the rest of the squadron, trailed after. Kramer read heading, airspeed, wind direction and speed, punched them into the pocket computer under his left hand. His right hand stayed on the stick. That was one of the Lightning's rules: you didn't ignore her.

He dropped covers over the inertial guidance board and the computer; except for the plan monitor, every instrument facing him was now pure WWII. Just as the plane, despite the IR lasers and the Lexan canopy, was pure Lockheed Lightning and mean as hell.

The P-38 was not a "pilot's plane." It was its own plane, with its own rules and its own punishments for pilots who broke them. But if you would learn the rules, treat the Lightning as your partner and not some dumb tin hoss, then the two of you would beat any lonesome cowboy in the sky.

Richard Bong had learned the rules. Dick Bong, Ace of Aces, shot down forty enemy planes, more than any other American in the war. Other pilots called the Lightning a deathtrap, but Dick Bong never flew anything else.

There was an unofficial rule, strictly enforced: no matter how many kills a pilot, staff or guest, scored in a P-38—and some, like Kramer, had hundreds—no more than thirty-nine victory flags would be pasted on the hull. Because some people did not forget.

Kramer read the plan monitor. The flight was forming into two-and-a-half finger-fours: two leader-and-wingman pairs like the fingertips of a hand. The Germans, who had invented the formation, had a rule that wingman must follow leader, into the ground if necessary. Kramer had moved his wingman to fill in for Cupertino, and doubted he'd feel the loss. He'd cover his own tail today.

And to hell with Mister Cupertino, who could no more pilot a plane without fly-by-wire than he could hold his liquor.

All of the planes on the monitor were within formation limits; two of the wire jockeys were drifting a bit, but the rest were right on their marks for position and height. Good enough for a Tuesday morning. Kramer pressed his mike three times, signaling Line Local that he was ready to start the game. Then he opened the interplane channel.

"Loose Goose Flight, this is Loose Goose Leader. We're getting into happy hunting ground for a hot-shot Heinie *Staffel,* so keep your eyes where they belong." *Oh, they do love the show.* "Remember,

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anybody who gets smoked buys drinks tonight."

Kramer looked at the top clouds, which were denser than he had thought earlier. Through a break in the layer he spotted a shadowed wing. He turned off the radio to swear, then broadcast "Bandits at two o'clock—everybody go for some Angels!"

"Whaaat's that, Captain?"

"More *height,* stupid—" Kramer swore again, silently. You could get fined, even fired, for insulting paying customers, especially on a Hazard Three line. The trouble was, it was Wendy Burden leading the *Staffel* of 109s up there. There was a heavy-money pot among the squadron leaders for most personal kills by the end of the month, and Wendy had a painfully long lead.

But Kramer was grinning as he brought the Lightning's nose up, and the twin props made music to a turbocharged beat. Messerschmitts were too popular for the flight leader's good; at least half Wendy's flight would be on the wire. Seven of Kramer's ten followers were genuine pilots. Plus Kramer. *Dick Bong got forty, all in Lightning strikes,* Kramer thought once more. *Come on, Roy-boy, you're bounced and you gotta bounce back.*

Half a dozen Emils knifed out of the cloud layer, yellow fire spitting from their thin wings. A red strobe flared on one of Kramer's planes as laser light found its kill-sensors, and smoke streamed from beneath its central fuselage, fanning out around the twin tail. The "crippled" plane wobbled, then went dead level as the wire took it over from its pilot. The plane banked gently away from the fight, toward the airfield, comin' in on a wing and a crystal-modulated pulse.

Kramer put his plane into an inside turning climb, feeling the drag of three gees; *lemme see a Link trainer do that!* He straightened out, keeping the nose up—to fight Bf-109s you had to get up there with them—straining against the torque from his twin engines. *Let 'er Buck.* He'd seen that in a photo, painted on a real P-38's nose, had almost borrowed it for his own but thought better of it.

An enemy plane turned, wavered—*ah-hah, wirehead*—fired well ahead of Kramer. "First lesson in deflection," Kramer said aloud, and banked, and raked the Emil's belly from barely eighty meters away. Strobe and smoke canister replied.

"I got one, Captain!" said a radio voice.

"Nice, Stone. Did you get his wingman?"

"His . . . what?" came back, as Kramer rolled on his back, splitessed, and shot the bandit off Stone's tail. "Check six, goddamnit!"

"Now, now, dot's all vell und goot, aber ver checkst *du?*" And a

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109, wings nearly vertical, slid down past Kramer near enough for him to see the face in the cockpit. "Takkatakkatakkatakka!" Burden yelled, on the staff frequency.

Kramer tipped his wings and weaved, scissoring with Wendy, trying to drop behind her—or at least stay wing-to-wing. Wendy'd give you one on credit, but never two. *Never* two. She couldn't kill him dead today, of course, it wasn't scheduled, but she could smoke him good. And when he "crawled home through enemy lines" tomorrow morning, he would be gleefully presented with tonight's bar bill. Which wouldn't have been so bad, except that as staff none of that bill would be his. *When the pros tilt the machine, we lose the bonus points.* Kramer thought of Wendy. *And the extra—*

"I tell you vat, Amerikaner. Ve got our own kvarrel, na ja? Ve go up und settle it vun-on-vun, like von Vatsisname and dot odder guy."

"Will you can that ridiculous accent?"

"Aaah, you're no fun. Least not where I can't *getcha.*" She flicked back to the general frequency. *"Sind Sie ein* Turtle?"

"You bet your sweet—" Kramer gritted his teeth.

"Last one to Angels Twenty's a wirehead!" Kramer winced again—you weren't *ever* supposed to use that word when a customer could hear—and he pulled back to match Burden's climb.

Then he saw the fog; and in half an instant it had him.

No Burden; no squadron or Staffel; no sky. Just a white . . . *something,* with Kramer in the middle of it.

Definitely not a cloud; he'd been in a million clouds, including storm cells. Anyway, if there had been weather coming Line Local would have vectored them all away, or called somebody to fix it.

His instruments weren't reading. Altitude zero, turn-and-bank zero, airspeed zero. Kramer thought of vacuum failure, but all these instruments had electric backup, and the electrical system was working. Lights were on, and the motors were spinning the props (though the tachometer denied that).

Kramer uncovered the inertial navigator. The red diode displays, so incongruous in a '42-vintage cockpit, read all zeros, more incongruous still. No one answered on any radio frequency, including the emergency channels.

He was rapidly running out of options. Ordinarily there was some course you could take, and be safe while you thought things through; at worst a nice flat oval. But what was flat, here? Seat-of-the-pants wasn't nearly good enough in this mess to keep him out of mountains, trees, and other objects harmful to aircraft.

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Taking a large swallow of pride, Kramer uncovered the switch that would put him on the wire. When you were staff ranked Three or higher, they gave you the choice. It was one of the several things Kramer liked about the Corporation. Sometimes he thought he liked this one better than the money.

Kramer pulled the switch.

Nothing happened. The OVERRIDE ACQUIRED lamp didn't light. The plane's attitude didn't change—at least, not so Kramer could tell.

And as he thought this through, something did happen: some of the white fog (or whatever it was) seemed to waver, as with heat, and turned silvery—a ring the color of crumpled tinfoil (*or crashed airplane,* Kramer thought) with a white patch at its center.

Though Kramer was not at all sure of distances, the white target looked just about P-38 sized.

"Any old port," he said, and pointed the plane, and went through the ring.

He nearly creased a hangar roof with a wingtip. The tiny airfield below—not one he knew—had just appeared out of nothing, and before he really decided what to do he had completely overshot it and was back in the whiteness.

And then—without having touched stick or pedals—he was buzzing the field again, from a different direction.

People were running on the ground, and the sound of an air-raid siren drifted up to him. The whine was oddly muffled, not just drowned by the sound of his engines. He overshot the field again—and again was above it.

Kramer circled experimentally, close to the white stuff. Whenever he edged into the fog, just nudging it, he was nudged out again. He looked around for the silvery circle, but it was gone.

A black cloud blossomed near him: a flak burst. *Did I read that damn chart wrong after all?* he thought. *No, I've strayed over a hill to Wendy's base . . . guess who's going to be buying tonight?*

Another burst went off, close enough for Kramer to hear the whistle of steel fragments. Something pinged off the plane's nose. *Oh, God damn, not a Hazard Five line.* He waggled his wings frantically and landed.

The flag hanging limp against the pole was a Union Jack, and no Alternities banner hung below it. Kramer did not recognize any of the people who moved slowly toward him; all he knew were the British uniforms, the Enfield rifles, the Webley revolvers.

He raised his hands. What else?

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Kramer paced the dispersal hut where the British (if indeed they were) airfield crew had put him for storage. There were six unmade iron beds, shelves and a cheap dresser holding personal things and bits of spare flying gear, and the debris of a fighter scramble: open books turned face down, half-full teacups, cigarettes left to burn themselves out. There had been no five-minute warning, obviously. A tiny coal stove put out a little heat, but not much; if he were a paying customer he'd have complained. *No, that's wrong*, he thought. *The customers like it. Part of the game. We're the ones who like being warm and dry.*

Kramer picked up a framed photograph, of a pretty young woman in an austere dress looking hesitantly at the camera. He read the inscription: *To Charlie from his favorite virtue. Patience, August 1940.* Kramer felt an unpleasant tightness inside and put the picture down, trying to restore its exact position.

Yes indeed, Roy-boy, he thought, *if things are really what they're looking like around here, you'd better be very damn careful what you touch.*

He sat in a rickety chair and took mental flights around the room, buzzing the piled sheets, orbiting the stove chimney, split-essing into the valleys between the beds. It kept his mind away from the windows, and the airfield beyond, the fog beyond the field . . . and what was beyond the fog. . . .

Kramer picked at the Alternities Corporation patch on his shoulder. *How do I tell the real from the fakes?* For nearly an hour he'd searched everything in the room for the Alternities arrow-A trademark, printed on or stamped into something. But it was nowhere to be found.

This *had* to be a line. Maybe a Hazard Five. They shot real bullets at each other; maybe Alternities didn't bother to label everything for the suicides' benefit. It had to be a worldline, because the alternative was . . . there was no alternative. They could *squeeze* time, sure, just like the ads said, a week's vacation in twenty minutes. But the first thing they taught in staff school was that time dilation wasn't time travel; no matter how much a line looked and sounded and smelled and tasted like the past or the future, it was all an illusion. They never let you forget it, either.

This *must* be a Hazard Five. They were all crazy on the Fives. Ever since Senator Cadogan got suicide legalized, the crazies kept finding bigger and better ways to do it. Alternities collected the dividends.

There was a knock at the door, and two men in pilots' uniform

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blues with lambswool jackets came in, followed by an officer with Intelligence badges. No Alternities signs in sight. "Station Commander 'ud like to see you now, Captain Kramer," one of the pilots said, quite genially. "Follow us?"

The pilots didn't look crazy, or sound crazy. Scared, a little, maybe, but Hazard Five types weren't scared of anything but living another day. The Intelligence man said nothing, and his look was blank; as they went out, Kramer saw the bulge of a revolver in his coat pocket.

It was freezing or a little below on the field, and damp, worsening the effect; but there was no wind at all. The flag, and a wind sock atop a hangar, hung dead. The air had a dense, unresonant quality, as if the world were embedded in clear resin, or a snowball paperweight. Kramer exhaled, and noticed that his breath did not form clouds.

There were no other people visible, and though a field like this should base about two dozen aircraft, only two Hurricanes could be seen, in a maintenance hangar with their engine cowlings open, the motors gleaming dully in the dull air. His own plane was gone, somewhere.

And in the distance, only a few hundred feet beyond the end of the runway and the last wooden building, there was . . .

Nothing.

A bowl of whiteness was inverted over the field. Kramer had been thinking of it as fog, but it was not like fog. There was no gradually increasing obscuration with distance; the airfield was clear, if dull, out to a point in the middle distance—and there the world ended.

Overhead, it was not like overcast. Clouds had qualities—they rippled, they moved, they showed a bright spot where the sun was—this stuff had no qualities at all, except density and pure typing-paper whiteness.

Kramer recalled that he had not been locked into the hut. He wondered if it had been purely from courtesy. Where, after all, could he go?

"Care for a cigarette, Captain?" one of the pilots asked.

"Here. Have one of mine." They paused to light up Kramer's lowtars. Kramer watched the white smoke trail slowly upwards, straight up, without even curling. He wonderd if it could escape.

And if not, what they would shortly all be breathing.

Station Commander Loyd sat at the opposite end of a conference table from Kramer. His uniform was neat, his gray mustache trimmed, but his eyes gave away the state of his mind; they were

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intense, twitching.

To Loyd's left was a WAAF corporal, holding a pencil ready over a pad. For the past hour she had been transcribing every word spoken in the room. Most of the words had been Kramer's. To the Commander's right was another woman, slightly older than the WAAF, in plain civilian clothes; she had pencil and paper before her as well, but the pad was blank and her hands were folded.

Kramer's idents were on the table before the Commander. The Intelligence man held a dollar bill from Kramer's wallet, turning it over and over. A few pilots and mechanics sat against the wall behind Kramer. All maps and charts still in the room were covered. Through a window, its panes taped to trap fragments, the null sky was visible, completely unchanged from an hour ago—or the three hours since Kramer had flown out of it and landed.

"Your opinion, Lieutenant Moore?" the Commander asked the Intelligence officer.

"Excellent work," Moore said, and put the bill with the other papers, giving it a small final push away from himself. "So good that . . . such craftsmanship would seem better applied to a fifth-column counterfeiting operation, rather than one such as this. If not for the date on the currency . . . "

"Can I ask what kind of 'operation' you think I *am?*" Kramer said.

"I will remind Captain Kramer," Loyd said stiffly but not harshly, "that while not a prisoner he is in custody . . . please don't speak unless asked, Captain."

Kramer nodded.

"Since the question is relevant, however, I shall answer it. I believe you were sent here to do exactly what you have done: tell us a story, corroborated by these papers and . . . other superficial details, of being from some . . . time in the future. Were we to believe this fantasy—"

"H. G. bloody Wells," one of the pilots said, and there was laughter in the back of the room. The civilian woman smiled faintly, and looked at Kramer for the first time.

"Corporal Parkes, you'll strike that comment," Loyd said, and the WAAF steno scratched at her pad. Loyd turned back to Kramer. "Were we to give even the smallest credence to this story, you could then issue 'prophecies' affecting our conduct of the war."

Kramer said, "And you think a plan like that would have a chance in hell of working?" Simultaneously he thought of Operation Mincemeat, "The Man Who Never Was," who had succeeded in his mission of deception despite the handicap of being dead.

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Loyd said, "I doubt it very much. But after Herr Hitler's leaflet making 'a last appeal to reason,' I daresay almost anything might occur to the man." He looked around, got a late, small laugh.

Kramer said, "Some of that stuff's a long way from being superficial evidence. Look at my plane, for God's sake. It's a Lockheed P-38G Lightning. The first of them won't roll off the line for two years yet; call Lockheed and ask—" He stopped, frozen by cold, cold looks from all around the room. Lieutenant Moore spoke: "No one is saying . . . the Germans are stupid," and Kramer supposed the pause had swallowed a "you."

"With a few exceptions in high places," a pilot added, and there was more laughter. Loyd opened his mouth, but his face softened as he did so, and he said, "There are quite a few places we'll be ringing up in time. However, just now our 'phone lines are out—a Heinkel crew will be painting that one on their ship, I suppose—and wireless appears to be suffering in the . . . meteorological disturbance." He looked through the window, but not for long.

Kramer understood perfectly. It was so much easier to believe in fog and Germans. Fog and Germans were threats to navigation and telephone lines, not sanity.

The telephone by Loyd's elbow rang. Its tone seemed muffled by the air. "Another victory for the Post Office," Loyd said, and picked up the receiver. "292 Squadron, Station Commander Loyd speaking . . . " His smile vanished as quickly as it had appeared. "I see. Very well then." He put the phone down. "The ground crew would like us to have a look at Cap—Mr. Kramer's aeroplane." He looked straight at Kramer. "You appear to have convinced a few of us," he said, in a voice that was level and calm and deadly bitter.

" '*Lightning Strikes Twice*'?" someone read from the airplane's nose.

"I should have thought better of it," Kramer said under his breath.

The P-38 stood in a vacant hangar under direct lights, surrounded by half a dozen mechanics. One was examining the twin tail-booms, measuring the distance between with spread arms, making notes. Another sat in the cockpit, moving with great care, sheer bewilderment on his face. The rest crowded around the underside of the starboard wing, waving inspection lamps, and Kramer knew without seeing that they had removed the gun inspection panel.

"It's a gas line, but it's not gas cooling," one of them said. "Not leading to the muzzles—and certainly not if it's really acetylene gas. Could be muzzle heat—but there are *these* things . . . "

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"What is it, Douglas?" a pilot asked.

"Haven't a clue, sir—but for certain they aren't guns."

" 'Perkin-Elmer'—I've heard of them," another mechanic said. "Make infrared stuff, don't they?" He turned to the approaching group, called, "Doesn't that make it your department, then, Miss Jaynes?"

"It might," the civilian said. With a passing glance at Kramer, she folded her arms and walked under the wing.

"Are you a scientist?" Kramer asked suddenly, a connection closed in his mind. "With radar—Watson-Watt, someone like that?"

There was an abrupt silence, and Kramer wondered if he had just gotten himself shot dead.

Miss Jaynes came back around the plane. She was the only person moving. "Tizard Committee," she said evenly. "I'm doing mathematical analysis of—the Squadron. These people do think a scientist's a scientist, though."

"But every inch a woman," someone said. Intelligence Officer Moore cleared his throat.

"What are they?" Jaynes said. "Even I know they're not guns."

"Infrared lasers—oh, God. They're . . . light rays, sort of."

"Death rays, now," said a crewman.

"*No,*" Kramer said. "I told you, we have simulated dogfights. Instead of bullets, we shoot light beams. When the beams touch a sensor on the other plane, it registers a hit. The gas bottle makes muzzle flashes and noise."

"Is that possible?" Loyd asked, of no one in particular.

After a pause, Jaynes said, "Professor Lindemann talks about infrared a great deal. Of course, what he says is Most Secret."

Moore turned deliberately away from her, toward a pilot. "Couldn't bombing pathfinders use something like that, instead of flares to mark the target?"

The pilot looked nervous. "I don't know . . . " He took a half-step away from Kramer, who burst out, "Oh, come *on!* Look at the goddamn *sky,* will you?" He gestured around the silent airfield. "Are you *really* still just waiting for the fog to lift? If I just popped over from jolly old occupied France in the lovely weather, where's the rest of your damn *squadron?*"

They put him in a closet this time, and locked it.

The click of the lock woke Kramer, who sat head on knees in a corner. He didn't think he'd been dreaming. Dreaming of nothing, maybe. White nothing.

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The door opened a crack. Slender fingertips curled around the edge. "We can't possibly talk in here," came Miss Jaynes's voice. "I'm taking him to the Mess for a cuppa."

"Are you sure, Vicky—?"

"Of all the things to ask, Alan. If he tries to use me as a hostage, I give you the Committee's approval to shoot.

"Captain Kramer? Would you come with me, please?"

He had no other options, of course.

They sat in the Officers' Mess, which would have been bright and airy in a different light and air. The blackout curtains were drawn—to block the view out, Kramer knew—and the electric light seemed to not quite reach into the corners. The smells of cigarettes and stale sweat were apparent but not strong.

Three officer pilots came in, "just for tea," and sat far away from Kramer and Jaynes, but they did not converse and there was nothing else to listen to.

"I want to talk to you about 'worldlines,' " Jaynes said.

"I don't know that much. Not technically, anyway . . . I just work there." He smiled. She returned it.

"That's all right. I'm just . . . well, I'm looking for something to do, I suppose. How many lines are there?"

"Uh . . . I don't really know. Let me think. Alternities advertising talks about twenty . . . the WWII line, the Three Musketeers–France line, the Medieval line, and so forth . . . but there are five Hazard Ratings, and some of those are on different lines, but some aren't. Plus there are some variant lines. And there are twelve gates at Ouray Center, under the Widow's Walk—"

"The *what?*"

"The gates are in a circle, facing out. You get dressed for your line in the center area. And on top of the center—uh, the Center center—facing all around, is an overlook, with glass, where the techs sit and run the controls. They call that the Widow's Walk, like those balconies on houses in seaport towns, where the captains' wives wait—"

"Yes, I know," she said, and looked toward the lieutenants across the room.

Kramer flew blind for a moment. She was really quite striking, he thought distractedly; not much of a figure—though who could tell, under that stovepipe suit?—but a jewel of a face, framed by deepest-brown hair. No makeup . . . don't you know there's a war on?—fine. Makeup confused the issue, created an artificial ideal of lips and eyes.

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It came gradually to Kramer that these thoughts were irrelevant, and he said, "Anyway . . . I'd guess eighty or ninety lines. Apart from Homeline."

"Which is . . ."

"Where we come from; where Ouray Center is. Home, you know."

"Doesn't anyone come from another line?"

"Of course not. There's nobody *on* the other lines, except the live-out staff. I went out past a Corporation boundary once, on the Hazard Four version of Transalpine '44. We were bringing in a flying bomb that wasn't on the wire. It was pretty d— . . . barren out there. Once you got half a kilometer beyond the fence—"

He stopped, aware she was staring, feeling the eyes of the other pilots burning his back. He looked at the draped window, realized how close to their present reality he had come.

Then, not as a question, she said, "Flying bomb."

Put it back where you found it, Kramer thought, and said, "Nothing . . . a weapon . . . forget I said it. If I tell you any more, you'll think I *am* making prophecies to scare you. It didn't work, anyway," he added, not sure whether he meant the real V-1 or Alternities' imitation, too frightening to be part of the fun.

"Hear that, mates?" came a voice, possibly drunken, from the other side of the Mess. "Cassandra 'ere says the doodlebuggers aren't gonna work. When's Adolf gonna give 'em up, then?"

Kramer said, "You told me . . . this was 1940."

"Twelfth November, if the clocks are still running properly."

Kramer stood up, rocking the teacups. He looked at Jaynes's puzzled-intent face, then around at the pilots, who were hunch-shouldered and hard-eyed. He was thinking it all had to be a joke, a great unfunny practical joke Line Local had played on him for getting lost in the clouds and pulling the chicken switch, and any moment Wendy and Heinz and Bill and Lin would pop out and demand to know if he was a Turtle, and everybody would buy everybody else drinks at the O-Club bar—

It was not until they showed him the victories board for the dozen bombs the Squadron had downed that Kramer really knew it was no joke, funny or otherwise, that no one was going to appear and laugh and show him Homeline beyond the stage fog. "Not until 1944," he said, "they didn't start until we were already in France," but here it was 1940 and this fellow had knocked three down with a wingtip and that one's aunt was killed in Eastcheap and Jaynes the mathematician stayed up late nights plotting the courses of the damned things.

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"But if I'm not on a line and I'm not in the past then *where am I?*" he persisted, until the Surgeon gave him a shot of morphine and he went to sleep, dreaming quicksand dreams of the V-2, and the A-10 also called *the America Rocket,* and the bomb to end all bombs, and four years' head start on them all.

Dr. Victoria Jaynes, Ph.D. Mathematics, Cambridge, stood in the still, cold, unnatural air, watching from a distance as the ground crew fixed a rope to Lieutenant Crisp. Alan smiled and nodded and gave testing tugs at his altered parachute harness. She could not hear him from this far away, but supposed he was making jokes and jolly-good-fellow conversation, just as if he was going to knock a few Huns out of the sky.

She looked up; smoke from the generator and the hut stoves was rising straight up as far as she could see, not bending, not diffusing. The barrier must be permeable, then, at the level of smoke . . . and if smoke, then oxygen. At least they wouldn't suffocate.

Alan waved, and they made the rope taut, and he walked off the edge of the field into the fog.

At once Jaynes understood what Kramer meant by its being wholly unlike fog; Alan was not enveloped, or gradually made indistinct. For a moment his figure seemed to streak, as if seen through a rain-wet pane, and then he was gone; and the rope stood straight, reeling into nothing.

"Take a field telephone," someone had said, "take an Aldis lamp," "take this and that and the other," until he'd said, "Isn't it enough that I'm going out to dangle like a bait on a line? Just let me go—" and they'd let him, of course. The Squadron Leader might have been able to overrule him, but if the Squadron Leader were here *he* would have been alone on the end of the rope.

The second marker flag came off the drum of rope; twenty yards. Jaynes tried to watch the flag's progress, see how far away the vanishing point was, but Alan's travel, or the flag's, or the flag's image's, was unsteady and the disappearance too sudden. She thought irresistibly of Einstein's thought experiments.

Thirty yards of rope.

Forty yards.

A dark spot appeared, near the rope's end, and Alan Crisp was marching out of the whiteness, trailing his rope, which still fed taut from the drum, through the air, into nothing and back again.

Jaynes gathered the papers she had been holding—aware vaguely that some sheets were crumpled in her hands—and walked quickly

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into hearing range.

"—round a tree, then, did you?" Commander Loyd was saying.

"Hardly, sir, since I never saw a tree. Nor so much as a bush. Or a pebble."

"What's it *around,* then?" said a WAAF, and a mechanic gave the rope a hard pull. Alan nearly fell backward.

"Will you watch that?"

"Sorry, sir. But . . . "

"All right. Together, then." Alan turned and grasped the rope. He pulled. The mechanic pulled back. More men and women joined in, tug-of-war fashion. Even the Commander took a hand.

"No good!" Alan shouted. "I'll have to—"

All fell down, the rope tumbling after. Without getting up, they pulled it in, a flag appearing, then another, another, and the last—until the whole intact rope was in their hands.

"Well, bloody *hell,*" someone said, possibly Alan. Someone laughed, and the laughter rose and spread, stifled only by the dreadful air.

Jaynes knew the sort of laughter it was, though, and was not ready to join in. Hugging her papers, she walked away, toward the Messroom and hot strong tea.

With a cup, her slide rule, and a pencil, she sat plotting the intersection of universes on a sheet of quadrille paper. She thought on that word, *quadrille; how proper it should be a dance as well.* Like Lewis Carroll's Lobster Quadrille. She could hear the clicking of claws.

No. No. I don't hear anything.

She tried to count universes, or "worldlines" as Kramer called them. Eighty or ninety, he said, but that was not a proper mathematical quantity. *There is one* x *such that . . .* or *there are infinite* x *such that . . .* but not some intermediate, casual number.

There must be something else countable, that might lead her to the numbers she wanted.

There were two wars—Kramer's war, over before he was born, and her own (and Alan's and the Commander's and the Squadron's). Two wars. Two Squadrons. Two Englands. As in a mirror.

Or between two mirrors, creating an infinity of reflections between them. Kramers, Jayneses, Loyds, in rows forever. And Churchills, Stalins, Hitlers, ranked like lead soldiers. Little tin Hitlers, more than real numbers could count.

Her pencil point skidded and broke, in the grip of her oldest fear.

"What's the matter, Vicky?" her father said. "Harmony Gloria, it's cold out here. Aren't you chilled?"

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Victoria Jaynes, six years old, stared up at the night sky and shook her head stiffly. In her lap was a sheet of paper, covered with pencilled numbers. She was being very, very careful, but in spite of it one big tear escaped her eye and went plop on the paper, making a digit pucker and run.

Professor Andrew Jaynes put his knees together and knelt on the tiles of the balcony, between his daughter and her telescope. He took Victoria's shaking hand, held it delicately, as if she were her namesake Queen.

"I can't count them," Victoria said, holding fast to her voice but letting the tears slip away. "They go off and on. And there's too many. There's . . . " She had lost the word as well. " . . . *forever* many."

The professor nodded. "Too many for tonight, certainly. Come inside and have some hot cocoa. And tomorrow I'll take you on a visit."

The man they went to see the next day had an office filled with pictures of stars; clusters of stars, thousands, millions of stars staring down from the walls. He listened very carefully to Victoria. And then, with star charts and graph paper, the astronomer showed her how to sector the sky: to lay a grid on the universe, so that the stars could be counted, one small square at a time.

Victoria started work that night. She was finished in a week. Not with the counting; with the need to count. She was finished with the fear of large numbers, forever.

She looked at her broken-pointed pencil. Very deliberately, she took it in both hands and snapped it in two, then dropped the pieces in the dustbin.

It had only been a few years ago that, reading a *Times* obituary, Jaynes learned that her astronomer had been Britain's Astronomer-Royal. She had never known, and it was too late to say or do anything.

She sharpened another pencil. As she bore down with it, the wood creaked, and she flinched. The pencil slipped from her fingers, rolled across the galaxy expressed as a tensor grid. She reached for it, reached further, but like the tortoise running from Achilles in Zeno's Paradox it stayed a bit ahead, just a bit, and the abyss yawned at the table's edge—

The pencil fell, and rose, cradled in Roy Kramer's fingers. He handed it back with some greeting Jaynes did not quite hear. She nodded, universal reply; muttered, "Sorry—thought you were a turtle."

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"You bet—" He shook his head, and without finishing the statement went away for a cup of coffee. He came back, sat down across from Jaynes, looked at her papers. "How's it going?"

"Around and around in circles," she said. "I . . . you need a physicist, Mr. Kramer, not a mathematician. My father would be right at home here . . . but I'm just pushing variables around. Even if I find some theoretical foundation for your having come here, it may be no help at all in getting you . . . us home." And as she said it, she wished he would go away and let her get back to the problem. She picked up her slide rule. "Excuse me, Mr. Kramer, but I seem to have mislaid a decimal."

He touched the slide rule, laughed. "Wait. Just wait. I've got something in the plane that'll startle you." He got up quickly. "Hold that decimal point!" Kramer dashed through the door, letting it bang.

Jaynes looked down again. She was trying to forget Kramer's intrusion, but was not succeeding. And she was trying very hard.

She tugged at the lined-over sheet beneath her Perspex French curve; the graceful arc on the paper was supposed to represent the trajectory of a particle forward on a time line—or a time-like line—through a universe of nine spatial dimensions. Six of the dimensions had imaginary numbers as coefficients.

And what was wrong with that? Just because they're imaginary doesn't mean they're not real. Besides, three dimensions isn't any more proper a mathematical quantity than nine.

She rotated the diagram, tilting it so different grids were compressed in perspective, and in a bright flash she saw the unintended symmetry of two positions, and then a third; all the dimensions seemed normal from their own viewpoints. If you were in the $+i$ universe, *any* $+i$ universe, your own mathematics would seem quite ordinary, while that of the other worlds looked irrational and strange.

And if space looked that way, why not time?

She sketched a circle along the swooping time-like line. From an internal frame of reference . . . if you were inside the circle . . . a time of n dimensions would look like another space of similar form.

The circle became a sphere, a perspective cube. A tetrahedron might work better, but for now this was enough. More than enough. *More than filling sandbags, Father.* She watched as the cube changed perspective in the classic optical illusion, now open from this end, now from that, now from this again . . .

" . . . all right then, Doctor?" She looked up with a start. Com-

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mander Loyd held the teapot in his right hand; his left rested very lightly upon her shoulder. As he slowly drew it back, she realized that her pencil was worn flat, and there was the coldness of tears around her eyes.

And the Commander's touch had been no more than the pilots sometimes got, when they came back with holes in their wings, and fewer than when they had gone out.

Though there was no resemblance at all between the two men—not even the touch on the shoulder—Jaynes suddenly saw her father, home from work at the Cavendish Laboratory. She had known from the tilt of his shoulders and the way he hung his hat that it had not been a good day in the Most Secret workshop.

"I've got some work for you, Vicky," Professor Jaynes had said, very seriously, tiredly. "It's not much, but it's mathematics. With Henry Tizard's people, so you'll have some authority. . . . Though for someone with your talent it's no more suitable work than filling sandbags for the W.V.S." He sat down in his favorite chair, knees together, back straight. He looked directly at her as he spoke, as always. "Lindemann came in today," he said. Sir Frederick Lindemann was the Prime Minister's science advisor, and a power in the land. "He asked about you, and I said you'd gotten your doctorate . . . and he said, 'Ah. And does she still make those splendid butter biscuits?' "

Victoria would have laughed, but her father's face prevented her. She thought she saw him tremble, wondered what would come out if Andrew Jaynes would only allow it. She could remember him differently, recall his comic distraction when atomic particles refused to behave properly, his bubbling joy when they did. She remembered walks in the park, where he would explain how light was waves and packets at once, pond ripples and popcorn.

It was the war, she would tell herself. And then she would tell herself it was not the war at all, or at least not the war against Hitler.

What had he been like with Victoria's mother? Had he talked of orbits and observable phenomena in an embrace until dawn . . . until she had died, with Victoria only two and less capable of understanding death than she understood the red shift (as of eyes when things close to them recede . . .).

It was only lately that Victoria had seen that her father's courtly embarrassment extended to every woman in the world . . . and Victoria was not a little girl any more.

"You'll be . . . careful, won't you, Vicky?" Professor Jaynes was

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saying. "Lindemann still hates Tizard, and . . . " He smiled awkwardly. "I'm so proud of you, Doctor. Just be careful, where there's power involved."

"Work's a help, of course," said Commander Loyd, from another universe. "But all work and no play, hmmm? Tell me, Doctor, do you play chess?"

Vectors in an 8x8 space . . . As she was about to answer, Kramer burst through the door, saying, "Damn! It's gone."

Loyd looked upward. "The . . . "

"Huh? Oh, hello, Commander. No, *it's* still there. Look, there was a little silver box in my plane, in the cockpit. Had a lot of buttons on it, and a line display—uh, a strip of glass. What happened to it?"

"Intelligence Officer Moore has it. Coding machine, he said it was."

"Well, it's not. Can I . . . can you get it back from him?" Kramer looked at Jaynes. "Miss Jaynes needs it for the work she's doing."

Loyd's look asked Jaynes something she could not answer. He stood, said, "If it's important, then of course I'll ask the lieutenant. Good day, Doctor. Mr. Kramer." He went out of the Mess.

"Wait'll you see this," Kramer said.

She nodded, the music, the voices in her head fading. *No. I never heard anything.*

She tried to ask him a few more questions about Alternities and the multiplicity of worlds; his answers rambled, and finally he said, "Look, I'm not much on theory. It was . . . what I *did,* you know? I'm a Guide, not a Tech. I fly planes—"

Loyd came in, holding a small flat object in both hands. Moore was behind him.

"We'd all like to watch this, if you don't mind, Mr. Kramer."

"Sure, Commander. Here, let me have that. Right. Sure you don't want to take notes, Lieutenant? This is a real Intelligence prize, even if it isn't a code machine."

"Scientific Intelligence is my responsibility," Jaynes said quietly, before anyone else could say any more.

"Whoever," Kramer said, and set the box before himself on the table. It was a little longer than a cigar case, less than an inch thick. On its surface were forty or fifty tiny buttons, and a long strip of glass with a mirrored surface beneath.

Kramer touched a button. The glass flickered along its length, and a hollow square of dots, and another dot, stood out dark at one end of the strip. Jaynes moved her head; the dots were not below the glass but within it.

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Then she realized that they were not just dots; they formed a zero and decimal. She began reading the labels on the buttons: there were the arithmetic operators, and sine, cosine, tangent, Σ +, logarithms common and natural, and more signs she did not recognize, like PEEK and POKE and GOTO.

"It's got a General Aviation program loaded now," Kramer said, "but we can erase that if you want." He touched more buttons, and an algebraic expression, with signs and parentheses and superscripts, spelled itself on the glass. Another few touches, and the characters shuffled about, a quadrille of black dots on silver, and another expression appeared. "I don't remember what I set up there," he said, "but that's the answer." Jaynes was perfectly sure he was right.

After half an hour of playing with the "computer," Kramer said, "Do you think this will make the work any easier?"

"Much," was all Jaynes could think to say. Moore and Loyd just stared at the box. Moore finally said, "How?" in not much of a voice.

"I was afraid you'd ask that. Do you know what transistors are? How about . . . valves, I think?"

"I know a bit about wireless," Moore said.

"Yeah, good. Well, this has thousands of . . . valves inside it. Etched on a silicon wafer with chemicals and lasers."

"Lasers?"

"The death rays on my goddamn *plane*," Kramer said. "Look, I like to think I know what goes on in the world, but I can't know everything." He covered the device with a hand. "And I warn you, you won't learn a thing by taking this apart—you'll just break it. And the Doctor here needs it, okay?"

"Mr. Kramer," Commander Loyd said, in a voice that made them all sit straighter, "I will remind you that you are a guest of this aerodrome, and not a ranking officer."

"Sorry," Kramer said. "Really." He held out a hand to Moore, who took it.

"Lieutenant," the Commander said, "I want to check on the petrol supply for the generator. If this clears—" he made no indication of what, and did not need to— "in the middle of the night, we'll need to light the field. For the Squadron. If you'd care to accompany me?"

"Of course, sir." They stood. Near the door, Moore said, only nominally to Loyd, "If he *is* a Jerry . . . well, I don't suppose I'll be voting for Herr Hitler."

After the door closed, Kramer said, "What was *that* about? Does he still think—"

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"It's a joke."

"Not funny."

"You don't understand. When we get a captured German flier here, Mooresy questions him. The last thing he asks is, 'Since it may be some time before you can be repatriated, do you think you'll enjoy life as an Englishman?' "

"Odd question."

"Exactly. It's so unlike the usual what's-your-name-and-unit stuff that it puts them off balance, and they burst out with the most amazing things.

"Once he had a staff officer—the man had been a pilot in the last war, and he was a real old Prussian Junker type. One of Fat Hermann's pals, I suppose, but a decent . . . anyhow, Mooresy asked his question, level as you please.

"And the officer stroked his mustache—'like they had a stroking formation in the Book,' Alan said—and said, 'Perhaps. But I doubt that I shall vote for Mr. Winston Churchill.' "

Kramer was quiet a moment. Then he laughed. "So the lieutenant's all ready for the invasion. What's he do, when he's not looking for spies? I heard most of the Intelligence types were schoolteachers."

"Actually, he runs a wireless repair shop. Rather large one, too."

Kramer stopped with his mouth open.

Jaynes looked at the draped window. "He should be in radar, but of course he hasn't any college, and I'm the only scientist he knows. Great help, that. He gave his profession as 'shopkeeper,' and whoever decides such things decided he could tot up columns of downed aircraft. He decides whether a kill counts on your record or not—is it any wonder the pilots all talk past him?"

"I see," Kramer said, and for the first time Jaynes believed he did; he seemed actually to be listening. Then he pushed the calculating machine toward her and said, "I'll show you how to program it," and she knew that she would be doing the listening, and (the click of keys in the Number Quadrille) it would be of her own will that she was silent.

Time passed in clusters of hours—days were counted, but seemed artificial without sunrise or nightfall. The air remained clean, without a hint of a breeze, and without freshness. It was still cold, but without wind to cut, the cold was noticed less and less.

To save on generator fuel, Commander Loyd ordered lights put out and curtains opened, and before long everyone was used to the sight of the white overhead—you could tell yourself it was just like

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morning fog on an overcast day, if you kept telling yourself so at frequent intervals, along with things like "better than being a submariner" and "better than hiding in a tube station or an Anderson shelter." The commander issued ration notices for water and food, partly from a real concern over the finite supplies and partly to give himself something to do in the absence of his Squadron. He should by rights have rationed Jaynes's paper and pencils, and she knew it, but he never did.

Everyone needed something to do. The pilots and mechanics sent out a few more expeditions, with field telephones and signal lamps but with no more success. They even tried to tunnel under and out, but the lead man down the hole came up white as the barrier itself, his yes like full moons, and they filled the works in quickly. The WAAF kept at their jobs, packing parachutes and folding forms until it seemed quite insane, and several went cheerfully enough when a young man asked them, neither they nor the young men caring that they could not go very far.

Lieutenant Moore shuffled his Reports of Enemy Downed, and over the wireless operators' half-hearted protests assembled a power supply for the little computer, since Kramer had no idea of how long its batteries would last. Kramer tried to explain laser beams and inertial guidance and failed, so he concentrated on explaining his airplane, and the weaknesses he'd found in flying the German ones, and the need of beating the Luftwaffe as badly as they possibly could. He described the silver ring he'd flown through, told everyone that if it should appear again to get him, no matter what he might be doing, really no matter what.

It did not appear.

Two maintenance crewmen disappeared completely for thirty hours. When they were next seen, one swore he had been nowhere at all; the other couldn't remember. Their watches were running, but disagreed with each other and with the base clocks. Neither had grown any length of beard.

Jaynes saw all this because she forced herself: for six hours each day she walked around the field, watching, listening, not going near her quarters because she knew once inside she would not come out.

"That's check, Doctor," Commander Loyd said from across the chessboard. Jaynes looked up at him, startled; for a moment, in the black and white pieces so neatly arranged, she had seen . . . a fragment of the whole . . . She said, "Smoke and air can penetrate because they're molecular. Quantum phenomena, not Newtonian at all. My father . . . "

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Loyd nodded gravely, glanced at his watch. "I've lost this one, I fear. Why don't you get some rest, Doctor? It's time, certainly."

"Of course it's time, what else . . ." She caught herself, and wandered back to her room, where the lines and numbers waited; and she rested without sleep, and was freed of space and time.

Time was not interchangeable with the other dimensions after all; that theory had broken on the third sally, and Jaynes had practically forgotten it. Time was rightly enough a set of dimensions, but one nothing like the others. That was absurd, and she laughed.

She wondered if she would have to invent a new set of numbers to count time. Jaynes numbers . . . *I'm so proud of you, Doctor Jaynes. Thank you, Professor Jaynes. Have a butter biscuit?*

A line of numbers sped past, too fast to count, but she knew them nonetheless: j, $2j$, $3j$, tearing toward infinity at right angles to the 1, 2, 3 of the natural numbers and the i, $2i$, $3i$ of the imaginaries. She turned round in her chair—

At the end of the number line, in the doorway, stood Roy Kramer. "I, uh . . . you didn't answer the knock."

"No. No, I didn't hear anything."

"Sorry if you're busy. I just wondered if . . . you'd like to have some tea . . . or walk around . . . or whatever."

She'd been hearing tales about The Yank. But maybe they were just tales out of school. Tales out of the world. "Is this really how American pilots knock up young ladies? I'd always heard—"

Kramer's eyes were as big as fists, and by the time he explained the difference of idioms they were out of the hut and embarked upon a serious walk.

" . . . the pay's good, but the real perk is that everybody gets ten days of line time a year—and you can take that squeezed, so you get it and two weeks' vacation both.

"There's a story that some staff saved up their time for five-six years, and finally got Workshop—that's the write-it-yourself line—to set up this incredible Regency fantasy—you know, like those Georgette Heyer books?"

She nodded, recalling *Simon the Coldheart* on her nightstand, with *Principia Mathematica* and her sky atlas and a disorderly heap of notebooks. And a framed pensketch, by one of her father's friends in imitation of John Tenniel, showing Vicky in Wonderland.

"Well . . . " Kramer said, "they spent a month throwing parties and dueling and . . . uh . . . "

"Wenching," Jaynes suggested.

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"Right . . . and when they came out, Alternities did some cleanup—I mean, they did a *lot* of cleanup—and opened it as a regular line." He looked at her, and quite suddenly frowned.

"If you're imagining me in laces, Mr. Kramer—"

"No," he said, more softly than she had ever heard him speak. "I was thinking . . . Alternities must seem pretty awful to you . . . with the war on, I mean. What I do."

"No. It doesn't, because—H. G. bloody Wells, isn't that what Tim said, when you landed? Wells wrote a book, rules for a game, called *Little Wars*. The introduction said it was for boys and 'that superior sort of girl who enjoys boys' games' —my father gave it to me, saying 'I hope you aren't considering becoming a footballer.' There was a lovely box of Britains Guardsmen, and a Naval Gun that shot dowels, to play the game . . . but that's not the point, sorry.

"Wells thought what a grand idea it would be to have a . . . 'Temple of War,' he called it, where we could put all the generals and war ministers and arms salesmen, with endless numbers of tin soldiers, and put an end to live ones forever."

Her thoughts were far afield, among ranks of smart tin Guards in bright enamelled uniforms. She felt a sudden flush of content-

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ment, of peace, as though the mad world around them had fallen at once into order.

She looked at Kramer, and stopped still at the sight of his face; he was clearly not imagining her in laces. "Mr. Kramer—"

He nodded. "I apologize. I just—I think intelligent women are sexy, okay?"

She burst out laughing, and he turned sharply away. She put a hand on his shoulder, guessing that she was expected to. "I've read a lot of Mr. Wells, Roy. He firmly believed that men and women should—"

Just then, the mad world fell into geometrical perfection. The pattern was very clear, and as simple as falling down stairs. The shock of realization was so strong, so physical, that she nearly did fall; steadying herself against something, she looked up to see if the sky had broken open to stars with the force of the thought alone.

Not yet—not yet. Just a little more to do.

It seemed that she had been doing something, or about to do something, but surely it could not have been as important as this. If it had been, she would have remembered it. There was something under her hand; it made no sound when she let it go. She turned and ran back to her room, knowing that her feet would crush no blade of cold-brittled grass, for she occupied nine different dimensions. She fell upon the pencil and the computer as a starving lioness on food.

And when, farther down the time line, she had the proof of her vision, her epiphany, the world in pencil rushed up to meet her eyes and darkened to nothing.

Dr. Jaynes opened one eye, and saw two black arms that reached for one another but did not quite touch. She pushed up from the desk, feeling great hard crusts in her eyes, tears turned to stones. A sheet of paper stuck briefly to her cheek, then fell away. It was not important, only a universe that might have been. The world that mattered lay before her on the table, just beneath the small shining computer, which said over and over in marching black characters, $F(x) = 0$, $F(y) = 0$, $F(z) = 0$ . . . and Mooresy's crude, humming power supply, which worked together with the computer though they came from different worlds entirely.

But that was the way of the universe she had drawn. The universe was two heavy pencilled lines that did not quite touch, the near-contact surrounded by an icosahedral cage, a twenty-sided figure.

She knew the shape of the fog, now, and where the break was in

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the line of reality, and—she thought—how to weld it shut.

She sat some while longer, looking at the papers, tracing the patterns the functions made. She even knew why there were twelve doors beneath Roy Kramer's Widow's Walk. Looking up, at the taped window, she could read the stations of the curve in space, black stars in the white sky.

And then reality closed the figure, and the second epiphany revealed itself to her; and she cried out with the pain of it.

"Come on, Roy. Get up. Come on now, wake up."

Kramer's eyes opened, but did not focus. "Wha . . . Vicky?" Reality blurred with the traces of his dream; pleasantly perhaps, but the dream was gone too soon to be sure.

"Kramer, get up. I have it. I have your route away from here."

He woke quickly enough then. She talked on, not seeming to notice that he was dressing in front of her. *Well . . . if* she *doesn't care . . .*

"Do you see how this line—it's a geodesic, though I know it doesn't look like one—just fails to close? That's us, our time. Time is a geodesic regardless of the number of dimensions, that's what I've found . . . but this means that Time is always under tension, very great tension. So when an imbalance occurs among the other dimensions, Time is the first thing to go. Do you see?"

He saw a smudged graph and a beautiful, puzzling woman. "It's all numbers . . . "

"Of course it's all numbers," she shouted. "*We're* all numbers—a height, a breadth, a depth, a duration, and a few others I haven't named yet. Listen to me, there's not *time*—"

Abruptly Kramer realized that Jaynes was not just running over with whatever it was she had discovered. She was reading her watch, the clock on the wall, the sunless sky, rushing him toward—

She stopped long enough for him to get them to the Mess, tea, coffee, biscuits. He poured. She rattled on.

"When Time . . . fractured, let's say; yes. Time fractured like a bone, and the ends flew apart under the stress; but then normalizing forces acted, like muscles seizing up, to pull it together again. Only it wasn't a single, simple fracture. It was a compound fracture, sticking right through the skin of space into another universe. And there's a piece missing."

"Me."

She nodded. "And the line can't knit . . . Time won't be conserved . . . without that piece." Her face was all twisted up, and from one moment to the next Kramer saw joy and confusion and pain and

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always, always urgency.

And he stirred. *Not yet, not yet,* she had said last night, let go of him as if he'd been a dead fish and run for cover. He'd almost chased her, but guessed she didn't want to be chased. She wanted to wait. That was fine with Kramer. He didn't want it to be too easy; he had the patience to learn the rules. He could wait, save it till it drove him like a drug, like it was driving her now.

"What is it?" he said, feeling his heart speed up. "Are we running out of time?"

"Time is *closed,*" she said furiously, then shook her head. "Oh—not what you mean. Yes . . . no, we're . . . I mean—is your plane fueled, Roy?"

"Yeah," he said, swallowing a chuckle. They wouldn't make the Mile High Club, but close enough—

"Then here's your course." She unrolled another sheet of paper, weighted it with teacups. "I've laid it over a sketch of the field . . . do you see these altitudes? You must get them precisely. Can your compass do that?"

Kramer looked at her, then at the paper. He read the line, translated it into aerobatics. A turn, a split-S, a vertical climb . . . *Last one to Angels Twenty's a wirehead.* "There isn't much room up there for all this . . . but I think I can hit it, with a few tries."

"Tries?" she said, a squeak.

Kramer stared. None of his instruments were reading right. The controls didn't respond. And the seat of his pants lied like a bastard.

"Don't try. Don't *think,* Roy. Just get in your plane and fly." Her voice was overloaded; when it burned out, the room darkened.

There was a long, quiet pause.

Kramer said, "You really want me out of here, is that it?" He tried to stop the words, but they tumbled on, out of control. "Things got a little warm last night, and now you want the Yank bastard to hie himself hence before he gets you any warmer. Right?"

Kramer didn't feel at all well. He wanted to punch DESTRUCT on his speech—but Jaynes just stood there like British Gibraltar, stiff upper lip and all that rot.

"I loved you, Roy," she said, and Kramer felt that old familiar stab in the chest. *Roy-boy, you did it again . . .*

Or was it that old familiar stab in the back? He said, "If you loved me, you'd—" and his stomach rolled over and dove. What in *hell* made him think he knew the rules without learning them? This was not his culture, his time, his world, his Homeline. He'd forgotten where he was, just like a goddamn paying customer—

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"Not that way," she said, and her voice was strong and terribly sad. "I loved you because you took the war away. No more warplanes, or flying bombs, or dead men falling out of the sky . . . we were all sick, Roy, couldn't you see? Sick with a . . . sort of creeping palsy, from being too close to too many young men who go out each day to die and kill. Like the sisters who tend lepers until they catch it too."

That much I understand. "All you mean is that you were beginning to enjoy your work," he said, trying to be gentle with the poor rattled virgin. He knew that feeling, every time he shot a friend down in flames. "It isn't wrong," he lied.

"No," she said, and put him into freefall again. "I could never have loved it . . . but I was beginning not to mind it. And that was worse, not to care.

"But then you gave me a problem I *could* love, and the means to solve it. Just for a little while I've been the greatest mathematician in the world, d'you know? Gauss never had a magic box, nor Poincaré, or Dodgson, or poor Galois. . . .

"Nor did they have a world to find again. And a ghost Squadron."

It's the Squadron leader, he thought. *She really has been standing on the Widow's Walk—oh Hell.* "You were trying to bring them back."

"No. Just trying to solve an equation. Two different things. Finally I saw the answer, and I thought . . . I knew I was in love, Roy. With numbers and answers and you. But then—"

He waited. Patience was the only virtue left.

"—I saw what followed the solution."

He gripped her hand, because flesh and bone were real. "What? *Please.*"

"The war," she said, in a tiny voice. "Again. But bigger, so much bigger . . . fought not just with bombs and guns, but with Time." She pulled away. "We shoot at the planes that pick their drowning pilots from the Channel. We wouldn't hesitate to fight them with Time."

Haven't scored at all, have I? he thought bitterly. *I haven't even convinced them what's at stake.* "I never got around to telling you about Dachau, did I? Auschwitz—"

"Don't," she said. "They're just battles long ago to you, but they're my future. The future of everyone here."

"They might be," he said, thinking *I* won't *not tell you. I'm not* that *proud.* "The atomic bomb—"

"What?"

"Yeah. A bomb that—"

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"Stop. Stop! *Stop!*" And he did. She spoke in a whisper. "Kramer—my father's in America. Working on an atomic bomb. No one else even *knows*. And if he knew it would *work*—" She shook her head violently. "Roy, won't you please help me let the world alone?"

"Do you know . . . what you're asking? What you're doing? What I can—"

"None of us knows," she said, suddenly cool. "We're all just playing with variables. X equals zero. Pawn takes knight. But pawns never bleed." She looked down, at the paper infinities. Kramer thought irrationally that it was the numbers themselves that were frightening her. She said, "Get in your plane, Roy. Fly away and start the world again. And the war with it."

Kramer folded his hands helplessly. He knew too well what the next move was, and for the first time in his life he wasn't ready to move when the woman was. "You said you loved me."

She turned her head, toward nothing. "I loved a set of undefined variables." She looked at him, cold as the winter fog. "You're going to ask me to come with you, aren't you? Forget it. The sides of the equation have to balance. You're the imbalance. You and your machine." She turned away. "I never let boys play with my toy soldiers. They only broke them."

Kramer nodded. *You learn quick, lady. It's my turn now.* "My dad always told me to stay away from intelligent women. You'll give your variables a goodnight kiss for me, won't you?"

And having drawn as much strength as they could from each other's blood, that was that.

There were, fortunately, enough ground crew awake that no one had to be roused. And the plane was fueled, ready; what else had Kramer had to do except care for it?

Jaynes watched them tow it from the hangar. Kramer gave the crew thumbs-up from the cockpit, then looked directly at her and blew a kiss from his gloved hand. Clutching the graphs close to herself with one hand, she waved—*For luck. No more than luck.*

The cockpit closed. The starter coughed, then caught, and the twin airscrews spun themselves invisible. A mechanic patted one of the plane's tail booms, then stepped clear, and the machine went rolling, bobbing, ungainly as all grounded birds, down the field.

It came by again, a dark green flash that stirred the first breeze since it had landed. Then it seemed to tense—and leaped into the air, wheels folding up, flaps retracting, wing arching over to miss the white wall enclosing them.

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Kramer began his bank. Jaynes could hear voices from around the field, doors and windows banging open.

Kramer executed a marvelously graceful split-S, over and down and out perilously near the ground. Then the Lightning gave a fuel-injected grunt, whine of props, whistle of wings, and it was climbing, climbing, joy of flight in light and metal. Jaynes looked up, past the ship's forked tail, the nose with the man within, to the empty sky.

A ring-shaped bit of it turned the color of quicksilver.

Dr. Jaynes looked at the papers in her hands, the numbers that could move worlds and bend time, *quod erat demonstrandum.* Loyd's voice came from somewhere, saying something; she heard her name but made no reply. There would, she knew, be Time enough.

Very carefully, she tore the sheets into bits smaller than her thumbnail, letting them fall straight down through the still air. *There was power, Professor Jaynes. I was careful.*

She could no longer hear engines, people, anything. She stared at the flakes of paper like snow in the grass, waiting for the wind to come and blow them away.

SECOND SOLUTION TO PARALLEL PASTS (from page 53)

Neither Cracker nor Ada thought to check on which calendars England and Spain were using in 1616. England was then still on the old Julian Calendar, but Spain had adopted the reformed Gregorian calendar, which was ten days ahead of the Julian. The two famous writers actually died ten days apart!

Robert Service wrote another poem about the Bard of Avon in which he disclosed a reason, based on the title of one of Shakespeare's plays, for believing that the plays were really written by Francis Bacon. Can you guess what play it is? On page 125 I will answer by quoting the poem's final stanza.

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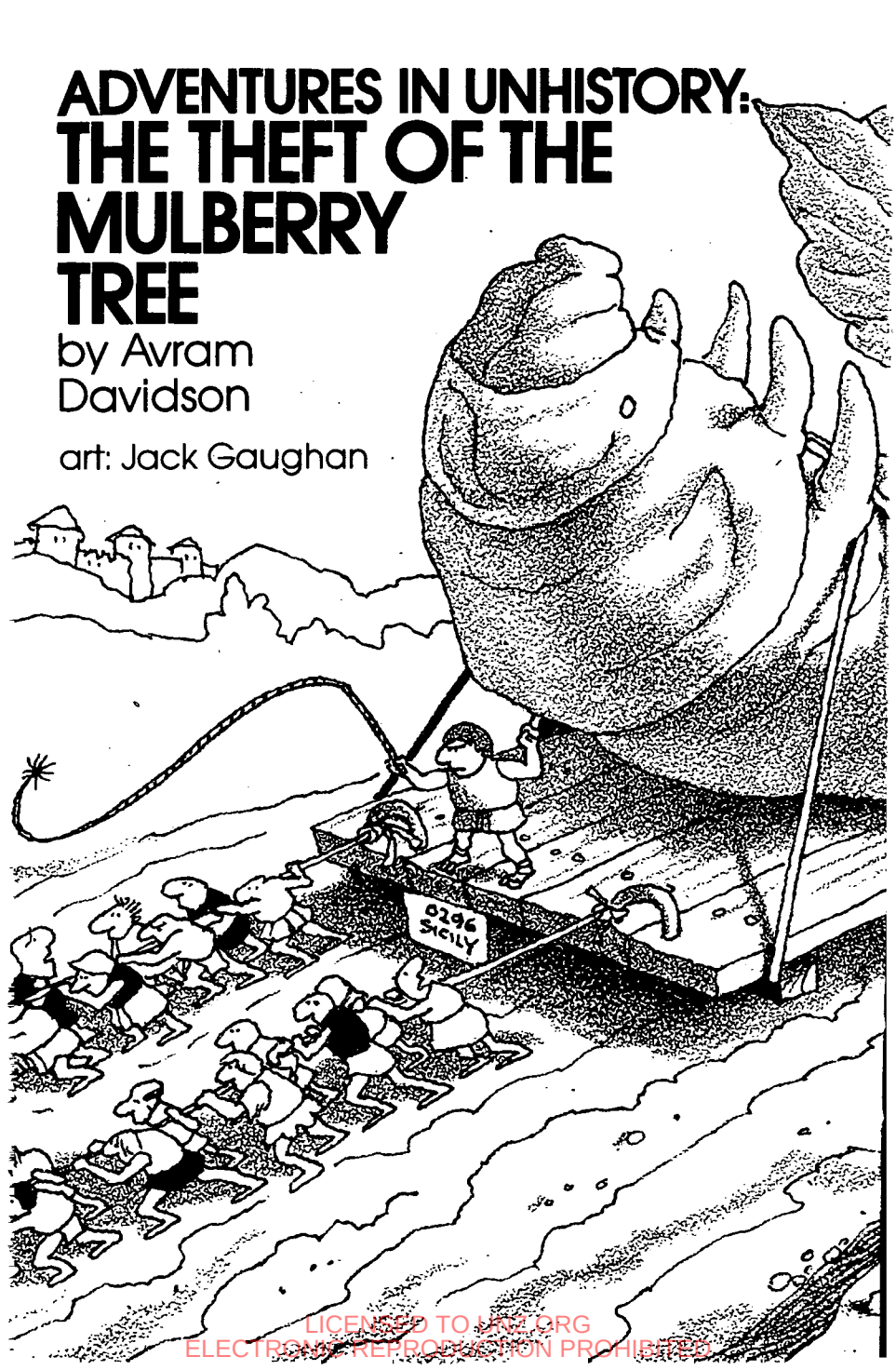
ADVENTURES IN UNHISTORY: THE THEFT OF THE MULBERRY TREE

by Avram Davidson

art: Jack Gaughan



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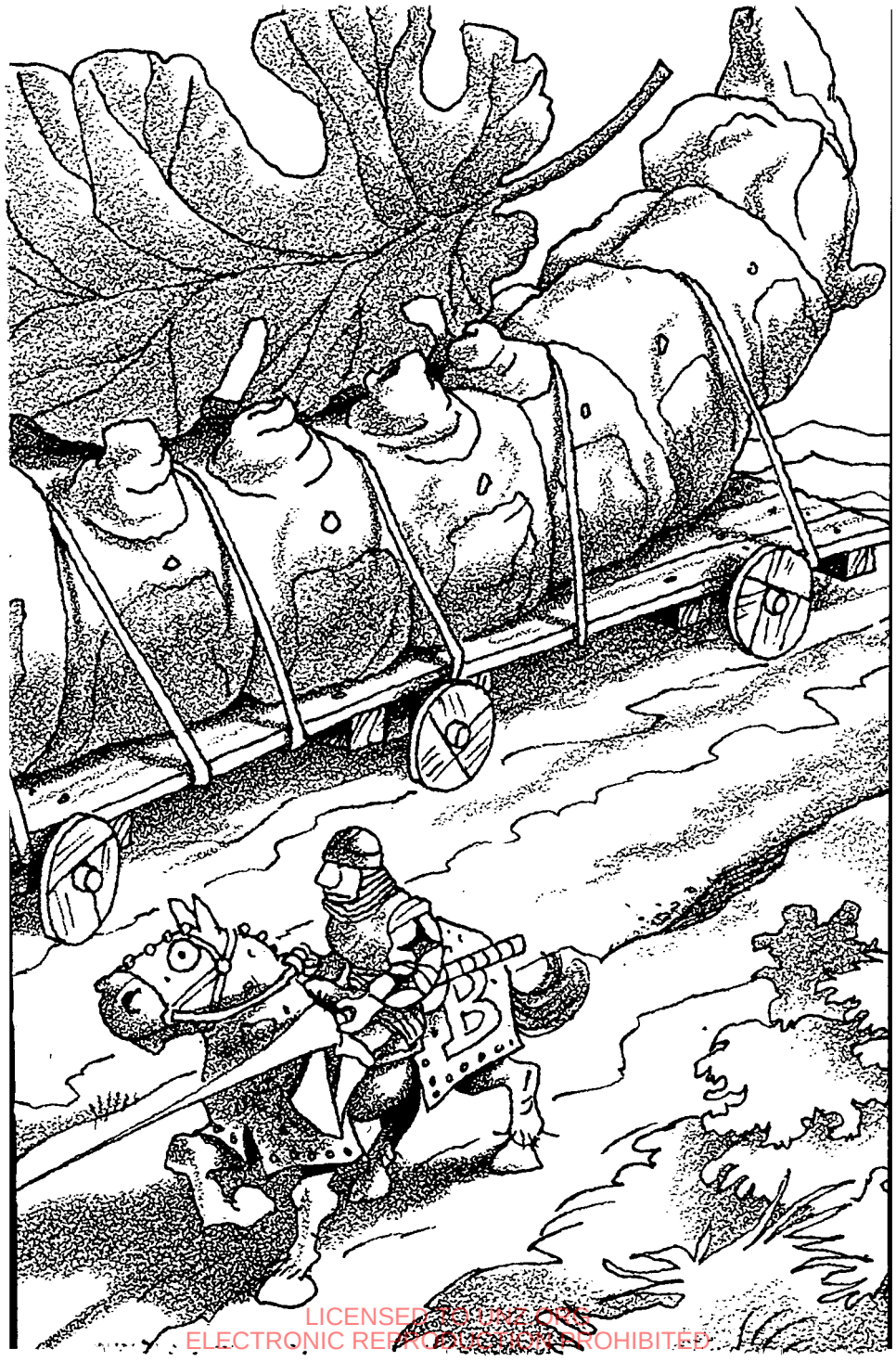
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Here, Mr. Davidson weaves (ahem!) a tale of the Other Roman Empire—the one that lasted for a thousand years after the fall of Rome—and all of it is perfectly true.

Knights did other things besides joust at one another with huge lances whilst mounted on huge horses—the ancestors, by the way, of those huge truck horses which pull brewery wagons: no horses of lesser size could maintain a man weighted down with full armor, let alone move at more than a slow trudge with such a burden. Knights, it is well-known, wandered an awful lot through forests, and the rescue of damsels in distress was such a steady part of their duty that the very phrase, "a damsel in distress," is one no longer taken seriously or said with a straight face. In fact, having become a cliché, it is now seldom said with any sort of face at all. In further fact, one risks the loss of face for saying it at all. One does? Okay, so I'll risk it. I have enough face as it is, and if I lose the one I've got, perhaps it will be interesting to see what kind I might get in return. Onward.

In this adventure the knight is named Yvain, and that is the sort of name which ought to trail epithets after it or shove them on before it: Yvain of the Silvery Shoe-laces, for example. Yvain of the Vain Effort, maybe. Pewter-helm'd Yvain. And so on. But I can't find out anything more about Yvain than the single entry in my notebook,* which I shall now quote for you without omission, save one or two words which have faded with the years. "Yvain—

"Yvain finds in the Chastel of the [faded word] Aventure a band of unhappy maidens, ill-fed and ill-attired, who are kept ever weaving silk in a meadow by two demi-devils, the lords of the castle, until a valiant knight shall come who can defeat them. . . ."

The more recent *Encyclopediae Britannicae* don't even mention Yvain in the Index, nor do I find him in my own files under HERO/-ES, where I should expect to find him, if anywhere. Exit, thence and thus, Yvain, a subject to mockery and puns. And, presumably, as he exited, he left behind him the unhappy maidens, damsels in distress if I ever encountered any, still ill-fed, still ill-attired, and still a-weaving of their silk. It is one of the innumerable enchanting images of the long-lost ages, and one, if devoid of glamor as we know the word, by no means devoid of glammory, which is to say enchantment; a word said to be derived from grammerie, or—simply —grammar. One had to be careful with one's enchantments; a slip of the

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tongue and you'd had it. The curse, for your spell might easily turn into a curse, would float seven years in the air until it was fulfilled.

As to *silk,* however, yes: I have quite a lot on silk: I didn't set out to have quite a lot on silk; it just growed. And perhaps if we pursue one of the silken threads, perhaps, perhaps it might lead us somewhere. . . . It might even lead us to the clue—and clue means after all a loose thread or cord—it might even lead us to the clue which in turn might lead us to the secret of those unhappy maidens.

And then again, of course, it might not.

Where to start, where to start? As though we have not of course already started! Well, well, sooner or later we shall come to that landmark in almost every Adventure, Pliny the Elder; and so here he is again, bitching as usual; but, as usual, telling us things of great interest. This time he takes us to the western borders of China, although, erudite as he is, he doesn't know that. In order to get where the silk-merchants are going, he said, one has to cross "vast wildernesses tenanted by multitudes of wild beasts hemming in those human creatures almost as brutal as themselves. Then, again we find tribes of Scythians and again deserted tracts occupied only by wild animals, till we come to that mountain chain overhanging the sea, . . . The first race then encountered are the SERES, so famous for the fleecy product of their forests. This pale floss, which they find growing on the leaves, they wet with water, and then comb out, furnishing a double task to our womenkind in first dressing the threads, and then weaving them into silk fabrics. So toil has to be multiplied, so have the ends of the earth to be traversed: and all that a Roman dame may exhibit her charms in transparent gauze."

Leaving aside the social comment (perhaps more suitable for *Women's Wear Daily*) and the geography, we learn that the silk was in the early days of the Christian Era not imported in the form of cloth, but scarcely altered from the cocoon. And if Pliny does not altogether describe the process of sericulture, still nothing he says is entirely wrong: it is merely that his information is out of date: the Chinese had begun to grow silkworms at home, so to speak; but there had been indeed a time when they found the wild silkworms, if one may speak of "wild" worms(!), as it were "growing on the leaves" of the forest. What does he have to say about the Seres, those peoples who gave the Romans their name for silk? He says that they have red hair and blue eyes! He had only to add that they were black, which he didn't, in order to have his description be "accurately wrong," to use Ward Moore's marvelous phrase. What! The Chinese with red hair and blue eyes? However—

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I did not say that his description would take us to China, but "to the western borders of China." Still . . . this is more or less in Central Asia, Turkestan, a region where one finds no people with red hair and blue eyes, unless they are there on tourist visas. But when we read in other sources that Chinese legends of the time equivalent to our own Dark Ages speak of barbarians living on their western borders who had red hair and green eyes, it is safe to consider that at one time a people of rather European appearance did inhabit Central Asia. And just as the gifts of Hyperborea were passed along from northwestern Europe by one tribe to another until they finally reached Greece and sometimes Egypt, just so, evidently, did the silk floss pass from China in eastern Asia from one people to another, eventually winding up in western Asia: and thence to Rome.

In fact, almost the entirety of the eastern trade of Rome was a luxury trade; they did not import rice, you know. And Pliny grumbles on and on about it: ". . . whole mountains cut down into marble slabs, journeys made to the Seres to get stuffs for clothing, the abysses of the Red Sea explored for pearls, and the depths of the earth in search of emeralds! Nay, more, they have taken up the notion also of piercing the ears, as if it were too small a matter to wear these gems in necklaces and tiaras, unless holes also were made in the body to insert them in! [. . .] And at the lowest computation, India and the Seres and that Peninsula [of Malaya] put together drain our empire of one hundred million of sesterces every year. That is the price that our luxuries and our womenkind cost us!"

Well, observe that at least he does not regard "womenkind" as a luxury!

Another landmark in these Adventures, and dating from approximately the same time, is *The Periplus of the Erythraean Sea,* which describes such immense and immensely dangerous tides which ships had to contend with in northwestern India that you may wonder what cargoes made it worthwhile. The *Periplus* tells us what they brought in: ". . . a great deal of thin clothing . . . figured linens, topaz, coral, storax, frankincense, vessels of glass, silver and gold plate, and a little wine." And here's what they brought *out*: ". . . costus, bdellium, lycium, nard, turquoise, lapis lazuli, Seric skins, cotton cloth, silk yarn, and indigo." This was one of the silk routes. There were others.

But by whatever route it came, and at whatever price it cost, this marvelous substance continued always to be in demand. The Roman Empire rose and the Roman Empire declined: but Gibbon, the fa-

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mous historian of its decline and fall, says of silk, "That it continued in high esteem is shown by the terms offered by Alaric [the Goth] for raising the siege of Rome: the immediate payment of 5 thousand pounds of gold, of 30,000 pounds of silver, of 4,000 robes of silk, of 3,000 pieces of fine scarlet cloth, and of 3,000 lbs. of pepper." Remember that there were no synthetics, and were not to be for about 1600 years: and that, for that matter, about the first synthetics were to be synthetic silks. Linen and wool were the two main textiles. The poorest of the poor wore cloth of hemp. Cotton was almost as exotic as silk, but not even cotton had the incredible smoothness and shiningness of this precious substance whose actual origin remained a mystery.

The tendency was, and perhaps still is, to spin out mysteries even more mysteriously, and to make the empty spaces in knowledge contain fancies either much better, or much worse, than the facts. Ammianus Marcellinus, another Roman writer, said (for example) that "The Seres themselves live quietly, always avoiding arms and strife and battles; and as ease is pleasant to moderate and quiet men, they give trouble to none of their neighbors." This might have come as a surprise to some of the neighbors of the Chinese, for the Chinese were just as bent on conquest and expansion as were the Romans themselves: all of what is now southern China, for example, was formerly a more northern part of what is now northern Viet Nam. But Ammianus Marcellinus continues: "Their climate is agreeable and healthy, the sky serene, the breezes gentle and delicious." Sounds like a real estate prospectus. Sounds like some of the descriptions of Hyperborea. Such regions are always located over the range of mountains just beyond the next range of mountains. Just so the Indians of the old American southwest assured the Spanish that the cities of gold were a ways down the pike, and the Africans informed the missionaries that it was the tribes across the river who were cannibals; and, as late as the last century, the Chinese assured foreign devil questioners that it was the city *up*stream (or *down*) which practiced the barbarous custom of drowning unwanted baby girls. (These last two may have been libels, but they were not libels invented by us.)

Just how remote the regions of the silk-makers were, and just how complicated the journeyings thither had to be, is indicated by a brief description of how the silk got down into India, where the Roman ships picked it up in the trade described a bit before. "This Central-Asian trade-route was first comprehensively described by Marinus of Tyre [in Phoenicia], some two generations after the Periplus. His

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account is preserved by Ptolemy, and is said to be based on the notes of a Macedonian silk-merchant named Maës, . . . who did not perform the whole journey, but repeats what he learned of Turkestan from his 'agents' or trading associates whom he met at the Pamirs [a high range of mountains in central Asia]. The route, he says, began at the Bay of Issus in Cilicia [in Asia Minor, modern Aegean Turkey], crossed Mesopotamia, Assyria and Media [that is, Iran], to [the city of] Ecbatana and the Caspian Pass . . . [and into what is now Afghanistan] . . . thence . . . through mountainous country . . . to the 'Stone Tower,' the station of those merchants who trade with the Seres." This "Stone Tower" has been identified with "Tashgurkan . . . on the upper Yarkand River in the Chinese Pamirs; a fortified town built on a great rocky crag that rises . . . at the convergence of routes from the Oxus, the Indus, and the Yarkand [Rivers]."

Now this, God knows, is far enough: but from there, from the Stone Tower, it was *seven months* "until the merchants arrived at 'Sera Metropolis,' the 'City called Thinae' of the Periplus." As to just what this place was it is vain to guess: but China itself had to be *some*where: so perhaps it was there.

And all this so that someone in the Roman Empire could say to someone else in the Roman Empire, "Stick with me, baby, and I'll wrap your ass in silk. . . ."

And our editor comments, "By too literal an application of this 'seven-months journey' both Marinus and Ptolemy were led into grave error as to the longitudinal extension of Asia." And you say, So What? Well, *this* what: Not only did Columbus have wrong info as to how wide the world was, thinking it was less wide; but Columbus had wrong info as to how near Asia was, and thought it stuck out much farther westward towards Europe than it did. Does. If he had had all the facts correct he might have stayed at home and investigated the prospects of the pasta business: in which case the Aztecs might be conducting their famous cardiectomy clinics all around the place, weather permitting, of course.

So you see, it wasn't pepper alone which led to the discovery of the New World: it was, in a way, also silk. Pliny of course had no use for either item, creating as they did an unfavorable balance of trade. As for the most famous, or infamous, trade which occurred shortly after the 12th of October, 1492, whereby we gave the Indians smallpox, and they gave us syphilis: perhaps it isn't true. Perhaps it ought to be. The first Spanish settlers didn't say nothing about that. They said that in the New Indies, silk grew on trees. In fact,

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the trees are still growing there, all round about the Carib Seas. But the name has changed slightly; they are now called "silk-cotton" trees. In Spanish, *ceiba*. Kapok, in other words.

This is merely mildly interesting, that a footnote to Marco Polo says of Curdia, that is, Kurdistan, "The principal articles of commerce [are] gall-nuts, cotton, and a species of silk called kas or kes, described as growing on trees." It is possible that again, some species of "wild" worm living off the leaves of "wild" trees is meant. Some might say that kapok, which fills lifebelts and so saves people from drowning, is intrinsically worth more than silk, which does not. However, recall that there is the surgical use of silk-gut for suturing: silk being organic, the stitches are absorbed by the body, and so do not need to be "taken out." Well, from whatever source, but most of it from conventional sericulture, down from Kurdistan's mountains into the great city of Baghdad, successor to Babylon, came the soft and precious threads, there producing "silks wrought with gold, and also . . . damasks . . . ornamented with the figures of birds and beasts." No wonder such things were considered worthy of the ransom of an imperial city, let alone "for the coverlets and cushions of the sleeping places of the rich."

And let's not forget that it was the Great Silk Road, or Great Silk Route, that the Polo brothers and Marco, son and nephew, used to cross the entire length of Asia. Nothing of less worth could have sufficed to keep a route open across such perils and dangers, deserts and mountains, as well as nations warring more commonly than not. It served as the sole land artery between extreme east and extreme west; and it served, too, as a slow, a very slow sort of telegraph wire across Asia. If the price of silk went up in Rome it was a sign that somewhere in Media or Mongolia there had been another war . . . another invasion. . . . The Great Silk Road was closed and opened countless times. Is it a fantasy to say that nowadays its route is in part covered by the Great Hashish Trail? —which, however, only goes as far as Nepal? —and which, passing as it does, through Afghanistan, is itself now closed? Has anyone noticed the price of hash lately?

As is usual, trade breeds trade. Messer Marco Polo tells us that the city of Tabriz in Media "manufactures . . . various kinds of silk, some of them interwoven with gold, and of high price. It is so advantageously situated for trade, that merchants from India . . . Baghdad, Syria, and the Persian Gulf, as well as from different parts of Europe, resort thither to purchase and to sell a number of articles. Precious stones and pearls in abundance may be

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procured at this place." Here's a good chance to say that it may well have been via just such a place or places that, about this time, the so-called Arabic numerals passed on their way from India, where they had actually been invented: passed thence from India to Persia, then to the lands of the Arabs, and so on into Europe. Where they proceeded to work a revolution in arithmetic, and, thus, in commerce, science, education, and the like: all without a drop of blood being shed. Though, perhaps, a number of tears.

The western ends of the Great Silk Route spread forth into sundry branches; but most of them converged again through the Byzantine Empire, with its access to the Caspian Sea and the Mediterranean and its almost complete control of the commerce of the Black Sea. Hence silk became and for long remained more or less a Byzantine monopoly. Byzantium might be officially called New Rome, but it soon ceased to be Roman in more than name. A different kind of culture developed, with an intense interest in the finer points of theology—did the Holy Ghost proceed from the Father and the Son, or from the Father *through* the Son? Was the Son made out of nothing or was the Son made out of something, and if so, what sort of something? The same *sub*stance . . . or the same *e*ssence? —and sometimes these fine points exploded into not so fine riots in the Hippodrome of Constantinople. Mainly, however, the Hippodrome, which served Eastern Rome as the Coliseum had served Western Rome, was used, not for the hideous gladiatorial combats, abolished in Christendom, but for chariot-racing.

After the races the Byzantines would eat; they were not gross feeders, like the gourmands of Old Rome in its decline. A French historian, René Guerdan, says, "Food was plentiful, though not excessive . . . hors d'oeuvres with [fish] sauce—caviar, olives, ginger, salad—followed by hot dishes of game and poultry . . . cakes and sweets . . . [and] wines . . . [and] ended with fruit." The dining rooms of the upper classes might be closed with "ivory doors [which] slid on silver [rods]. . . ." Far from glorying in drunkenness, they avoided getting drunk. To keep fruit from falling off of trees too soon, they carved verses from Homer on the trunks. Science was not very strong, neither was street-lighting, and—a nice touch, I think—when the Byzantine emperor "went abroad at night he was accompanied by two elephants bearing torches in their trunks."

A subtle but a key difference between the Old Rome in the west and the New Rome in the east was that the official garment of the citizen of (old) Rome was the toga, a shapeless, graceless item made of wool; the Byzantines of the citizen class by now dressed in silk,

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which was by now abundant enough to allow substantial robes to be woven from it; no longer was it so costly that it had to be stretched, so to speak, into gauze. Wool was itchy, and it smelled, and it was hard to wash. The new age was an age of silk.

Guerdan says, "[Byzantium] was situated on the main trade route between east and west, the route favored by the great galleons and light feluccas sailing from India, Ceylon, and China or from the western points of Venice, Amalfi, Genoa and Marseilles. . . . By seizing every point of access to the Black Sea, she managed to take over all the sea-borne trade of South Russia. . . . From China came raw silk, spun silken goods, and porcelain. . . ." Sometimes—in fact, often—in Constantinople the spun silken cloth from China was actually unraveled to supply more silken thread from which new garments were woven— "of all colors, with, perhaps, a striking purple, a sombre violet, peach, and pale green occurring most often. . . ." The west envied Byzantium, the west hated Byzantium, the west wanted Byzantium to go right on producing all those silks. Of course the place was a nest of heretics, what did it *mean* by insisting that the Pope was merely "first among equals"? —place should be burned to the ground; however, put that torch down; no place produced such lovely church vestments, either.

It has been said that the Eastern Roman Empire survived for a thousand years chiefly because of its bureaucracy, and this included the very careful keeping of records. So we know that among its exports were items as prosaic as "figs, oranges, almonds, melons, mulberries, chestnuts, soaps, and sponges," and items as gorgeous as "embroidered and damask tapestries, leather dyed purple, dalmatics of blood-red rubies and scintillating stones, articles of bronze inlaid with silver . . . enamelled silver vases, cloths of sumptuous silk, vessels of gold . . . ewers of pure crystal, pouches full of diamonds, gem-studded daggers, inkstands of gold, sandalwood and ebony and ivory . . . porcelain eggs full of rare perfumes," and so on.

Now, all this had to be financed. "The Patriarch Theophylact had in his stables 2,000 race-horses, of which he was passionately fond. They were fed on almonds, pistachios, raisins, and figs, moistened with precious wines and perfumed with saffron. . . ." If you think this was paid for by the pennies of the widows and orphans in the collection-boxes, well, of course, you **don't**, *do* you? And when the emperor, dressed in hyacinth-purple silk and precious furs, casually tossed bread to the people, "thousands of pieces of bread, each containing three golden, three silver, and three copper coins," well, it

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was not likely the money came from a considerable sale of soap and sponges, now is it? Use your heads. And although the Byzantines in their policies as regards the ever-importuning barbarians preferred a practice akin to Brigham Young's policy in regard to the Indians— "Flour is cheaper than gunpowder," said Brother Brigham—still, even flour has to be paid for. So here is the way it was:

Guerdan: "A duty of ten percent was levied on all exports and [on] all imports." Got 'em coming and going, didn't they? "One of the customs points was at Abydos [on the Aegean], the other at the entrance to the Black Sea. And a curious sight it must have been to see the customs officers, in their search for [what was termed] 'silk under linen or metal hidden under wax,' pierce even the smallest packages with long, slender, sharp-pointed rods." How did this detect "silk under linen"? Your guess is as good as mine. Perhaps the two textiles just felt differently, when a long, slender, sharp-pointed rod was pushed through them. And maybe it was all a fake; maybe the customs officers watched the faces of the owners of the packages, and, if the latter people flinched— "Ahrright, let's open it up!" —Maybe.

Ten percent coming in, ten percent going out. How could they lose? Well, the question was not that so much as, how could they gain even more? Answer: By growing their own silk. Was how. But China, ancient and incredibly distant, preserved the secret. So, meanwhile, the far-ranging trade went on. Past the Great Wall. Past the Gobi Desert. Over the cold Pamirs. Past the frozen and lofty Himalayas. Over the Oxus and the Jaxartes Rivers. Under the shadow of the Great Stone Tower. Across the waters of the Caspian Sea, heavy with sturgeon and epsom salts. Over the bars and shallows of the Indus with its ship-killing tides. Through the burning waters of the Erythraean Sea. The lands where Prester John ruled (only maybe he didn't). The lands where the Old Man of the Mountains didn't really hold any castles (only maybe he really did). . . .

On the way of course one encountered sundry tribes of barbarians. Not all of them were as barbarous as they used to be. Few if any were the barbarian leaders like Attila, of whom it was said that he "drank only from wooden vessels, ate only meat, and never smiled. . . . *He would not even eat bread!*" scorning it as the food of peasants. But here a later traveller describes another semi-savage leader living far into Asia: "I found him sitting in a tent—" thus far it could have been the king of the Huns, but listen: "—seated on a chair covered with gold-embroidered silk. The tent [itself] was lined with

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silken cloth of gold. . . ." Those who lived along the Great Silk Road were discovering its pleasures for themselves. This particular barbarian tribe was, in the earlier days, of not much consequence; it may even be that there were some in Byzantium who had never heard of them. This tribe was called Turks. They may not have known, exactly, where all that silk was coming from. *But they knew where it all went.* Turks, they were called. **Turks.**

It is true that this stuff was not everywhere equally valuable; it was said about the island of Java that silk there was cheaper than cotton. Or so the Arabs said. These, essentially desert-dwellers, had their own evaluation of the true wealth of Java. They called it the Land of Water. In Ceylon, the very horses of the king wore silken coverings and halters of embroidered silk; but then, they also wore golden anklets, and had been trained to dance before their royal owner.

We recall old Pliny's scarcely-veiled scorn at the feminine demand for silken gauze as a peekaboo garment; but Juvenal, the savage Roman satirist, did not veil his scorn at all when he wrote about its use as a masculine garment, and his contempt burst out when a Roman lawyer defended his own practice of wearing it (and, evidently, nothing under it)—in court, no less!—on the grounds that the weather was hot— "Why wear anything, then?" demanded Juvenal. "Go naked, while you're at it!" —And yet there were people who said that Juvenal was bitter, and who said that he was such a disagreeable man . . . *and I can't think why . . . no, I can't think* why. . . .

Meanwhile, the great Vitruvius had shown that silk had other uses, back in the days of the greatness of Old Rome; Vitruvius was an architect, but he expanded this profession far more widely than it had ever been expanded before: everything which had anything to do with buildings, said Vitruvius, had to do with architecture: for example, painting murals on the walls. He was concerned, for example, with *minium,* a lovely red paint (which gave us our word *miniature,* by the way). "To give minium its final protection against discoloration by the effects of the sun or moon," declares Vitruvius, "the following and difficult operation must be performed: once the wall has been thoroughly dried out, a coat of very white Punic wax blended with oil must be applied with a silken brush," did you get that? "*a silken brush* . . ." No coarse hog-bristles nor badger-tail-hairs, even: *silk.* Nothing but silk was good enough. And as we admire the few remaining Roman wall paintings, largely in the ruins of Pompeii, we may perhaps give a silent thanks to old Vitru-

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vius: he may well have been *right.*

But in the days when Byzantium alone maintained the Roman imperium out of Constantinople, or New Rome, it was not bloody likely that those in charge of things in *Old* Rome were concerning themselves with painting pictures on the walls. Walls were probably lucky to get a coating of coarse plaster and some licks of whitewash. And—what? A shortage of whitewash? How come? A shortage of lime, was there? Oh. Well, let's make some more lime. Burn some marble, that'll make lime. Well, what's the problem, *now?* It costs too much to bring marble down from the quarries, nowadays? Excuses, excuses: what about all them damned old heathen statues? *They*'re made out of marble, ain't they? All them wicked old pagan gods and goddesses and heroes and emperors? Burn 'em up.

And burned up a-many of them were. To make lime, to make whitewash, for the houses of the Gothic kings and counts who sat around their fires in the city where no Western Roman emperor any longer ruled. The fires of course made the walls smoky and streaked with soot. So: give'm a good coat of whitewash. Never mind them old marble statues, much good *they* are, anyway . . .

Meanwhile, back to Byzantium. The emperor there is named Justinian. He may not have been a totally nice man; it is rather hard to *be* a totally nice man *and* an emperor; but he did have the welfare of the Empire at heart. He did not kill any of his enemies for fun and games as Caligula and Nero did: he only did it for the good of the Empire. He even reclaimed a lot of the lost territories of the old western empire. He codified the laws, so that people would know where they stood. And he worried about that perpetual old worry, the Balance of Trade. Now, for example, the cost of silk . . . : if only silk could be made at home . . . if only silk could be *made* at home . . .

There were some monks, missionaries into that ever so far distant land which the west was beginning to become dimly aware of as China. True, these monks were Nestorians, heretics: a pity. Still. China, hm. Justinian spoke to these monks. He may have been persuasive. He *must* have been persuasive. Did he offer or even hint of offering freedom from persecution of the Nestorians, there at home in Byzantium? Did he offer, we shall not say *bribes,* the Nestorians had their expenses, too; who would and in fact who *could* refuse an emperor? Who would dare to quote Vergil in this instance, *Timeo Danaos et dona ferentis*? Beware of Greeks bearin gifts? The monks listened and the monks nodded. The monks, no doubt, offered prayers for the well-being of the emperor and his empire and its balance of

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trade. And the monks set off on that long, l o n g journey overland, to China. And, eventually, the monks came back. . . .

It had been a fatiguing trip. Who would wonder that the monks were themselves fatigued? That they leaned upon staffs? The staffs were made of some strange wood which grew profusely in China; it was called bamboo, and it had an odd characteristic: it was hollow. To show the emperor that their staffs were hollow, the monks broke the staffs open. Guess what was inside? The eggs of the silkworms. Thousands and thousands and thousands of them . . . No, the silkworms did *not* eat wool. They ate *leaves*. By preference, mulberry leaves. And as it happened, the climate of the Byzantine empire was ideal for the cultivation of the mulberry tree. In fact, it was already growing there. Had been growing there, probably, for ever. In fact, was mentioned in the Bible. Of course it wouldn't hurt to plant some more. Lots more.

Thousands and thousands and thousands of them . . .

The monks had certainly not been idle. The monks had observed the techniques of silk-cultivation: sericulture it is called. The monks had been apt students. And the monks proved apt teachers. Of course silk and silk cloth and silk clothing continued to be imported out of China. The market was insatiable. And the market expanded, and it went right on expanding. Pretty soon even the middle classes could afford silk; well, anyway, the upper middle classes. The monks died, eventually, and so did Justinian. Byzantium went right on producing silk. (Alas! it also went right on persecuting the Nestorians, too!) Its manufacture and distribution and sale constituted a sort of quasi-monopoly.

And so, eventually, this attracted the attention of the Normans.

I don't know what they teach schoolchildren about the Normans nowadays. For that matter, I don't know what they teach schoolchildren about anything nowadays. Now, in *my* days . . . well, in my days, they taught us that the Normans had come down from Norway or anyway somewhere Norm, and settled in northern France, and then one day in 1066 crossed the English Channel, conquered the Saxons, and obliged everybody to say **pork, veal,** and **beef**: otherwise we would presumably be saying **pig-meat, calf-meat,** and **cow-meat.** As though that would make a difference in the price. And, as far as what else they taught us in school about the Normans, that was all about the Normans.

Well, as a matter of fact, that *was*n't all, at all. As far as the Normans were concerned. Only a small group of them settled in England. Most of them stayed right on in France, in that part still

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called Normandy. Unofficially still called. Officially, of course, since Bonaparte abolished the provinces and divided them up into departments, it is probably called Boublioi-le-Suife. Or something like that. However. *Lots* of Normans kept on going south. In fact, some of them didn't stop till they got to Sicily. Which is, if you want to know, pretty far south. So there was a Norman Kingdom of Sicily. Did they teach the Sicilians to say **pork, veal,** and **beef ?** Probably the Sicilians couldn't afford to know. Well, actually, it is a fact that Sicily was a lot more prosperous then than now. It had a lot of Arabs, in those days. No, I am not going to make ethnic jokes: Sicily *did* have a lot of Arabs in those days, the Arabs having at one time conquered Sicily. Most of them who stayed on were good citizens, and certainly taught the Normans a thing or two. Or two thousand. Or two million. So let's look at what life was like in the Norman Kingdom of Sicily. You'll never be able to say *I* didn't tell you.

One of those Sicilian Normans, or Norman Sicilians, became Holy Roman Emperor: I refer to Frederick II, and among other influences he accepted from the Saracens without presumably having to have his royal and imperial arm twisted, was that of the harem: to further confuse all these cultural crossings, he kept the ladies housed in an old acropolis: and in the same place he kept his cheetahs. There was a lake, too, and Philippe Diolé says that it was this lake "in whose small skiffs, painted gold and silver, the king amused himself with the ladies of his court." One must hope that the ladies were amused, too. Morris Bishop says that "Physically Frederick was short, stout, balding, nearsighted, with something snaky and demonic in his green eyes."

The capital of this kingdom of Sicily was Palermo; and, as I have said the Arabs once ruled it, it is appropriate to hear what one of them, Ibn Jubair, says about Palermo. It is "an ancient and elegant city, magnificent and gracious, and seductive to look upon. Proudly set between its open spaces and plains filled with gardens, with broad roads and avenues it dazzles the eyes with its perfection . . . palaces are disposed around the higher parts, like pearls encircling a woman's full throat."

In an imperial villa in Sicily is a room, one hopes a large one, still called "The Chamber of the Ten Maidens." Perhaps it is an echo of the ladies of that harem just mentioned. And perhaps it is an echo of something else, mentioned a while back. Perhaps we shall see.

Probably the most famous of these southern Norman kings was Roger, and his chief assistant was a Syrian from Antioch, a Christian named George; but the Arabic influences were so strong both in

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Antioch and Palermo that George was known by the Arabic title of Emir. And we shall come to him again. Meanwhile, keep this in mind: "Despite its mountainous interior, Sicily is potentially very fertile. Even now its olive and almond trees, its wheat fields, and its pastures can produce substantial revenues, provided there is good irrigation. . . ." So let us think of these ladies in the harem of the Christian monarch, nibbling their olives and their almonds and perhaps tossing the pits and shells into the lake or onto one of those "gardens like Persian carpets," where there was always the sound of water flowing or trickling or splashing somewhere . . .

Here are some other images: ". . . most Italian gardens were laid out on hills," and let us remember that the harem was housed in an acropolis and that an acropolis was always on a hill; ". . . terraces and flights of steps had to play a large part in the design, and these architectural elements of gardening the Italians learned to handle superbly well. . . . The fall of the land they skillfully made use of to construct elaborate waterworks: cascades and fountains and flowering waterways of the greatest ingenuity. . . . In these vast pleasure grounds there was generally a smaller *giardino secreto,* a secret garden somewhere near the house . . . a green cavern full of shadows, and pools where goldfish [dance and] dart, and the sound of little streams."

And, of course, these ladies had to be dressed; and, being the ladies of a king, and sometimes an emperor, they were of course often dressed in silks. The silks came already woven and embroidered from Byzantium, but Byzantium had yet a long way to go before it became reduced to the size at which it had begun: a small place surrounded by walls containing more stone than the buildings inside the walls. Byzantium was still an empire, and this empire included central and southern Greece, included the cities of Thebes and Corinth, "an important centre for silk weaving, one of the chief of Byzantine crafts." And, one might add, one of the chief sources of Byzantine revenue. As we have seen.

We are about to see now one of the mainstays of King Roger's power, whose "navy was [composed of] Arab hulls driven by lateen sails, Levantine pilots steering by Persian charts." We may credit much, perhaps most, maybe even all, of this to that other clever Levantine, George of Antioch. "By means of this [lateen] sail, affording as it did increased speed, the Norman navies in Sicily were able to run rings round Byzantine vessels, which, except for light craft, were driven by oars in the old Graeco-Roman traditions." I believe it was King Roger of whom it is said, "He was really very

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clever, but he was not entirely a nice man."

And so it was perhaps "Early morning in Palermo, a dream surviving the sun and languishing over a stilled sea. . . . The water is an elastic carpet, on whose greeny reflections eyes rest before their light is thrown back, and whose oiled-silk surface is so flat and thick that it seems to be held taut over the same foundations of the town, piled up off it with heavy brush strokes—" Perhaps it was on such an early morning that the Arab-designed navy of Norman King Roger of the Christian kingdom of Sicily set out upon an expedition to attack and to plunder the western parts of equally Christian kingdom of Byzantium, on the other side of the Adriatic. But this was no ordinary plundering expedition. It must, for one thing, have taken along quite a number of gardeners. These gardeners were thieves. The things they thefted were mulberry trees, for which the Grecian city of Thebes was famous. The mulberry trees were to be replanted in Sicily, where they had not grown much before. Why such a fleet for such a purpose? No one who has ever eaten the bland and only mildly sweet fruit of the mulberry tree would fight a child for a fistful of it. But the Theft of the Mulberry Tree was not for the fruits. *It was for the leaves.* **The leaves feed silkworms.**

Roger was looking into the future. And when the future had arrived, Roger's navy went east once more, once more into "the Gulf of Corinth . . . an important centre for silk weaving, one of the chief of Byzantine crafts. Roger's soldiers made off with the women workers, those skilled in the raising of silkworms as well as the specialists in the art of weaving. They were taken to Palermo and housed in the Palazzo Reale [the Royal Palace], where they formed, after the Arab and Byzantine custom, the *Tiraz*, the official workshop."

Another source sums this up more succinctly. King Roger's governor, "the Emir, George of Antioch, led a profitable expedition which plundered Athens, Thebes, and Corinth . . . kidnapped many silk-workers to create . . . a flourishing industry."

It was said of King Roger that he was broadminded and liberal, and I hope that it was so. I hope so for his own self, for all of his subjects of the island of Sicily, where the mulberry was now to grow and flourish along with the almond and the olive. And I hope so in particular for the sake of these women silk-workers. May I bring you back, if your minds have not already brought you back, to the beginning of this adventure, and to the mysterious and to me mostly-unknown knight, Yvain, who found in a chastel in a forest "a band of unhappy maidens, ill-fed and ill-attired, who are kept ever weaving silk in a meadow by two demi-devils, the lords of the castle,

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until a valiant knight shall come who can defeat them. . . .?"

It is my belief that I have in large part explained this mysterious captivity of the distressed damsels clad in miserable tatters who worked and toiled creating the stuff of gorgeous garments. I do not wish to believe that it was King Roger and Emir George who were "the two demi-devils, the lords of the castle" of this captivity. I should prefer to believe that these were two other guys, over in Byzantium, and that either Roger or George was the valiant knight who had come to defeat them. Rumpelstiltskin took straw, and wove it into gold. The maidens took mulberry leaf and in effect wove it into silk. Some stories have happy endings. Some have unhappy ones. And some have none at all.

*According to the notebook from which I quote (written up during the 1960s and already in places as illegible as a papyrus palimpsest), the source is evidently *"STUDIES IN THE FAIRY MYTHOLOGY OF ARTHURIAN ROMANCE, by Lucy Allen Paton . . . 2nd edition; enlarged by a Survey of Scholarship on the Fairy Mythology Since 1903 and a Bibliography by Roger Sherman Loomis / Burt Franklin Bibliographical Series XVIII, Burt Franklin, N.Y., 1960"* —a title almost as long as my extract.

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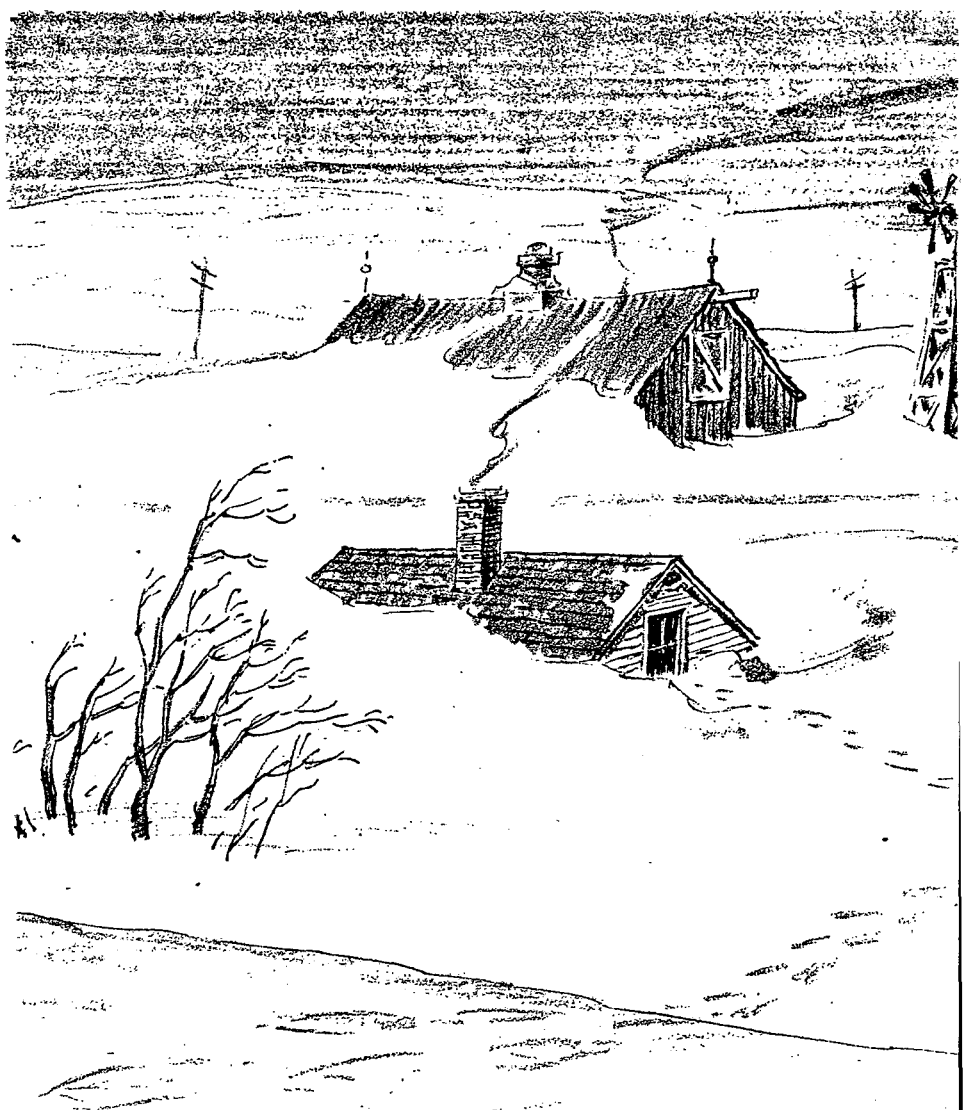

THE NORTH WIND

by James Gunn

art: Frank Borth

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In addition to teaching English at the University of Kansas at Lawrence, Professor Gunn also conducts a short, intensive seminar on the teaching of science fiction at that University each summer.

The north wind doth blow,
And we shall have snow,
And what will the robin do then,
Poor thing?
He'll sit in a barn
To keep himself warm,
And hide his head under his wing,
Poor thing!

—Nursery Rhyme

The ice sheets on the North American continent advanced as much as fifty kilometers that winter, but almost nobody was around to notice. Virtually everybody had gone south. They were huddled in battered Florida or troubled southern California, or had pushed farther toward the equator through shattered Mexico or island-hopping through Cuba, Jamaica, Haiti, and Puerto Rico in a bloody reverse migration.

About forty miles from the Kansas border with Missouri, John Reed still farmed the sheltered valley that had been farmed by his family for nine generations. For him it was the winter when the first arm of ice thrust over the flint ridge at the northern end of the valley.

For twenty years, half Reed's lifetime, the glaciers had been driven south by the relentless pressure of the ice behind. At first they came down the easy descent of the Missouri River valley, starting at the Garrison Reservoir in North Dakota and, after grinding its massive dam into powder, pushed down through South Dakota, split Nebraska and Iowa more effectively than any flow of water, and then hesitated where the Missouri River valley turned east toward the greater ice flow that had replaced the Mississippi. Now the rivers of ice had turned into sheets, engulfing the land from horizon to horizon and steadily surging south.

That was the winter, too, that Reed discovered the girl in the ice.

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For several years after the riots in the cities were over but predatory bands were looting their way across the countryside, Reed had lived in a cave located in what once had been called "Hidden Valley," abandoning his home to the brigands who had made Kansas bleed as it had bled two centuries before. That was after his wife and children had been killed while he was transferring food to the cave. He had returned to find the men drunk in his living room. Quietly and efficiently, as he had done everything in his life, he killed them. He buried his wife and children in the old family cemetery on the hill, which had not been used since they opened the cemetery in town a century and a half before. He dug a common pit for the looters and shoveled dirt over their bodies for sanitary reasons.

For a while he had no contact with anybody; he had been numb, and by the time the numbness was gone the others were gone, too, from the town and from the other farms. Some of them had gone to where a little warmth still came from a spotless sun; others had been driven away by the looters, or killed. In the aftermath of his personal tragedy he had removed the rest of the food and the tools and the weapons and anything else that might be of use to anyone. And the books. He still liked to read in the evening by the sheltered light of his antique Coleman lantern. He read the old words mostly: Browning and Tennyson and Frost. "These are the times for Frost," he would say to his wife, before her death, looking up and chuckling. And she would frown at him in mock reproval while they listened to the north wind whistling around the corners of the house and the snow piling up on the roof, making the rafters creak.

Eventually wounds stop bleeding. The looters stopped coming. The Great Plains, where there was nothing to stop the wind or the glaciers, got too cold for them, and there was nothing left to loot. They, too, went south, and died or survived in the melee there. After waiting two years—he, like the ice, had patience—Reed repaired the damage the looters had done and the weather had done after them; he rebuilt what they had burned and moved back into the house his great-great-grandfather had built, where generations of Reeds had lived while they farmed the land, and died and were buried.

He, too, farmed the land. It was difficult and it got steadily more difficult, but he planted spring wheat at the beginning of the short summer, when the glaciers did not so much retreat as paused for a few months as if to gain new strength, and he harvested, if he was lucky, before the snow started to fall again. He found and penned a few chickens in the barn. And he hunted—northern animals had

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been pushed south: caribou and moose, and also the wolves that preyed upon them and made short work of the domestic dogs that had turned wild.

When he wasn't farming or hunting or doing chores around the house, he sometimes went to the north ridge and looked toward the approaching ice. At first there was nothing, then a white haze in the distance that he could see only when the day was clear. Then as it got closer the haze turned bluer, in some instances almost indistinguishable from the sky, and he began to estimate how soon it would enter his valley.

It had come sooner than he expected, but he knew he would not be driven out. The looters had not done it and the ice would find him just as stubborn. He would stay there until the end, keeping what was his by right of inheritance, by right of the blood in his veins and the blood of Reeds spilled upon the ground, and by right of the sweat that had turned a wilderness into a human place. The wilderness might reclaim it, but not without a struggle.

There, looking at the ice looming where he had been accustomed to stand upon the flint ridge, he saw the girl for the first time. She was only a glimmer of color within the face of the ice. He thought it was an illusion, but he stepped closer to the blue mass, feeling it suck the warmth from his face and his hands, and brushed at the snow adhering to the surface of the ice. He saw more color and tried to peer deeper. Then it was too dark to see anything. Next morning he returned with an axe and a shovel and shaved away enough ice to see clearly.

Inside the ice, lying as if asleep, was a young woman, a girl. She had dark hair and a fair complexion, and she was dressed in a fur coat—muskrat, perhaps—and she had furlined boots on her feet. She was lying almost horizontal with her eyes closed and her face peaceful.

She was not beautiful, at least not at first, but Reed could not get over the wonder of her there in the ice.

The snow came down in the night in large, wet flakes. That was the first time he dreamed about Catherine. When he awoke he couldn't remember what she had said to him, only the urgency in her voice and the feeling that she wanted him to do something.

The snow fell all the next day and the next night—a meter or so in all—but the following day was bright and clear. The sunlight glinted off the mounds of snow like a knife to the eyes. Reed discovered in himself an unusual impatience, but he forced himself to

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rebuild the fires, restock the supply of firewood inside the house, and feed the chickens before he set off again for the face of the glacier.

This time he wore snowshoes that he had made himself and carried a broom. The glacier was twenty kilometers from the house, and he was out of breath by the time he got there. The last hundred meters he almost ran.

The glacier seemed closer. It had moved into the valley, well beyond the flint lip. He did not care about that, but it spoke of dynamic processes within the ice that threatened the vision he had seen there. For a few moments he leaned on the broom, reluctant to begin the work of unveiling that might reveal his vision as nothing but a dream inspired by loneliness, or worse, that the girl in the ice had been destroyed by the inexorable movement of the glacier.

He should measure the rate of progress, he told himself. If the glacier moved as fast as the ice had been advancing generally, it would approach his house by the end of winter, and the next winter its first advance would engulf it. But such considerations were only a means of delaying the moment of reality and were swept away as easily as the snow that covered the glacier face.

Once more he peered into the ice. She was there—just as before—and he felt a vast sense of relief. The uneven strains and pressures within the ice that made it crack and groan as he stood there, that made it surge forward at irregular intervals, had left the girl untouched.

He had not realized until now how much he had come to depend upon her existence, and how much, during the two nights and a day he had been imprisoned by the snow, he and his imagination, he had come to question the magic of her appearance. By what processes, natural or supernatural, had she got here? Standing in front of her on his snowshoes, with the north wind cold around his face and plucking at the folds of his coat, he looked at her lying peacefully within the ice, like someone who had just lain down for a moment's rest, and he wondered again.

Had she been caught in a blizzard far to the north? Had she wandered helplessly through its blinding fury until, at last, she had given up the hopeless struggle and lain down to wait for the end, huddled to retain her body's heat? And toward the end, had she felt the chill fade into a deceptive warmth so that her body relaxed and stretched out as it was now? Had the snow around her body compressed itself into ice, and had the ice carried her all the way to this spot, untouched by the terrible forces that pushed it forward, indif-

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ferent to all obstacles?

It was too astonishing to think about, but he kept returning to it again and again, constructing fancier and more fantastic scenarios to explain her presence almost at his doorstep. Finally he believed in it because it was real, and he came to accept it, as sinners accept God's grace. He even constructed philosophic justification for miracles. All unique events, he told himself, appear miraculous to those to whom, by chance, they happen. Mammoths and other creatures of an earlier ice age had been found in glaciers. Why not a person today? Once in a million years—if that was the frequency—was not so incredible.

For a while, then, chin on the handle of the broom, he was content just to look at her, to enjoy her company almost as if she were a living person come to relieve his solitude. Finally a grinding noise from the glacier and the loud crack of ice splitting stirred him from his contemplation.

"What shall I do with you?" he asked the frozen figure. "Shall I leave you here to the mercy of the glacier that brought you this far? Shall I carve you out and take you down with me into the valley? It's a long trip, but I could make a sledge—I'm handy with tools, you know—and I would tie you down securely so that you did not fall off. I could bury you up on the hill with Catherine and Billy and Josie, and all the other Reeds. They wouldn't mind."

But the ice was inexorable. It would grind its way across the hill as well as through the valley. It would grind the hill flat and with it all the bodies, corrupted and uncorrupted, lying there. Oddly, he did not mind that his family and his ancestors should be pulverized by this great, impersonal, natural phenomenon; everything would be turned to dust and returned to the soil eventually, and someday, if the ice ever retreated, a part of the land would be more fruitful because of it. But that this miraculous apparition should have come so far without damage only to be destroyed by his intervention seemed sacrilegious.

He could keep her near him to wait, like him, for the end, but that, too, seemed unfit, as if he were to capture the rainbow and keep it in a jar for his convenience. And, since he was a man who considered consequences, he thought of the brief summer when the ice would melt and his frozen miracle would thaw into clay like the mud in which she would lie.

No, he decided, it would be better to leave her where she was, to the forces that had brought her this far. He would return when he could to see if she was all right. At the moment of that decision he

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heard the ice shift and saw it plunge toward him by almost a meter. He staggered back, clumsy on his snowshoes, and then looked with sudden alarm toward the face of the ice. The girl was still there; she was still all right.

The incident stirred him to action, however, and he climbed the snowy hill beside the ice until he could see the blinding horizon where the unblemished sun had climbed two hands' breadths into the sky. Cool as it had turned, he could not look at it, nor in that direction. He would have to make some snow glasses, he thought. To the west, in places where the snow had been blown free of the ice beneath, he could see that the glaciers had advanced generally. He looked upon a scene of desolation, like the north pole, ice and snow as far as he could see; they had consumed everything in their path, leveling and then concealing what they had destroyed.

He should find a way to keep track, he thought. It would not do to be engulfed without warning. He wanted to meet the end, when it came, awake and aware of what was going on, and he wanted to know how long it would be. Landmarks still stood at the edge of the desolation—a hill in the distance with a tower on it, a tree still struggling to survive a few hundred meters from the frozen wasteland—but he would need a theodolite to measure angles and a way to mark the spot on which he stood. Until he could make something that would serve, he descended the hill, slipping only once, and paced off three snowshoe lengths and then three more from the glacier's face toward the valley and scratched a deep mark at each place on the brown flint rock that had been protected from the drifts.

He turned and looked once more at the girl in the ice, and turned toward the valley and home.

Reed returned the next morning. The sky was overcast and the clouds were heavy with snow, but he could not keep away. Nothing else demanded his attention; there was not much to do in the long winter except repairs, and he had done all of those. Even if he could have been out in the fields, he didn't think it was any use. Last summer nothing had grown; next summer the snow might never melt.

He walked up to the face of the glacier in his snowshoes, carrying a bundle of laths on his shoulder. He was surprised to discover that the advancing ice had obliterated his marks on the flint ridge; in fact, the ridge itself had disappeared under the glacier and the hill on which he had stood yesterday was distant and capped with the ice that filled the entrance to the valley at a level some meters above

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the hill.

The ice was like a living creature advancing upon him faster than he had imagined. But when he thought about it he realized that forty kilometers a year was an average of nearly one hundred fifty meters a day over the ten months the glaciers advanced. This arm of the glacier had moved at least that far in the past twenty-four hours.

He had given up the idea of the theodolite. After toying for a while with an old telescopic gun sight, he had realized that he soon would have difficulty climbing to that point of land, and he wasn't really interested in the general progress of the ice sheet, only the part that had begun to occupy his valley.

He was not surprised to find the girl in the ice untouched. At its base the glacier carried along rock debris that chewed up the soil and stone beneath, and the ice that held the rock flowed like slow water, but neither affected the girl. Reed was beginning to think of the girl as indestructible, as a gift carried into his life as compensation for the destruction of the past years and that yet to come. She was lying in the same position, as if she had been waiting for him.

"Ice is plastic under pressure, you know," he said to her. "It flows like a liquid, only very slowly." He thought about its progress in the past few days. "Maybe not so slowly." He stopped, a bit embarrassed by the sound of his voice in the wasteland, by the way it bounced back at him off the ice. Then he shrugged and leaned his bundle of sticks against the face of the glacier. He removed his snowshoes and put them down in the snow where he could sit on them, close to the girl but not so close that he would be struck by a sudden lurch of the ice.

"No one thought," he said, "that an ice age could develop so quickly. The scientists said that even if the conditions were right the ice sheets would take centuries to become a factor. 'The continental glaciers were not formed in a day,' they said. Of course they had no experience with glaciers except those left from an ice age that ended twelve thousand to thirty-eight thousand years ago. During an ice age, glaciers behave differently. It may have had something to do with what they called 'catastrophe theory.' The glaciers over Greenland and the Antarctic moved a few inches a week, and even the valley glaciers of the Arctic, only several feet a day."

He leaned back and put his hands behind his head, making himself comfortable. He hadn't had anybody to talk to for several years. He had been alone too long, in silence too long. That did bad things to a man.

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"Then came what the scientists called a 'snow blitz,' when the snow didn't melt in the northern latitudes all summer. Then came another. Each of them brought a hundred feet of snow or more. The glaciers spread down from the Arctic, and up from the Antarctic. They covered Canada within a decade. Scandinavia, too, we heard on television, and the northern half of Russia. Siberia went under even quicker. The Baltic Sea froze over and the North Sea. Scotland was covered with ice and parts of Germany and Poland. In the later stages we were getting reports only by radio, and then that stopped, too."

He glanced at the girl from time to time as if checking to see if she were listening. "What the scientists called 'the albedo effect' took over. Ice and snow reflected more sunlight; the more sunlight they reflected the less heat was retained by the earth. That made the summers even colder." He shifted his position so that he could look at the girl while he was talking. "Looking back upon it," he said, "I wonder if the new ice age didn't begin about the time I was born. Temperatures got steadily cooler for a couple of decades, and then the sunspots disappeared almost entirely. Radiation from the sun dropped by ten percent. Or so they said."

A snowflake hit Reed's face and melted, and then another. He looked up to see if it was blowing off the glacier, but it was coming from the sky. He could see the flakes, large, laden with moisture, slowly drifting down. Another storm was developing, but it would be several hours before the drifting flakes became a blizzard. He had become expert at predicting snowfall.

"I was ten, I guess, before the Arctic ice began surging down over Canada. No one believed in an ice age. Everyone thought the cold summers and colder winters were simply statistical aberrations, that temperatures would average out. 'All we need is one good hot summer,' the optimists said. Of course a few alarmists said that it was the beginning of an ice age. Boy! Were they surprised when they turned out to be right." He laughed.

"There were anomalies. Scandinavia had a warm spell that held back the ice for several years, but then it came with a rush. Finally scientific data began to accumulate: the absence of sunspots, the average decrease in temperature worldwide, the accumulations of snow and ice, the lowering of ocean levels. Theories were proposed and checked. Finally everybody agreed, cheerfully enough at the time: we were in for an ice age. It wouldn't be like the last one; we had civilization, we had science. We would dig more coal, create more heat, add more carbon dioxide to the atmosphere, start a green-

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house effect that would counteract the sun's betrayal. Science would find an answer."

The snow was getting heavier. Reed looked once more into the sky and knew he would have to get started home soon. "Some northern cities thought they could protect themselves with heat barriers; they would build more nuclear generators and let the waste heat keep the ice away. Others thought they could divert the ice with huge vertical knife-edged barriers made from old automobile bodies backed with rock and earth and cement. But the forces that could wear down mountains pushed them aside as if they were built of sand.

"Eventually the northern populations began trickling south, slowly at first. The Canadians were accepted in this country without question; the Swedes and the Norwegians met more opposition because the population was denser, but they finally were allowed into Denmark and then, as the ice pushed on, they and the Danes were admitted into Belgium and the Netherlands, Germany, and even France and England. The Finns, though, were turned back at the Russian border; they, too, moved into western Europe. In most places everything was friendly; it was like temporarily out-of-work relatives moving in for a brief stay."

Reed got up and put on his snowshoes. "Science had no good answers, it turned out—not against the kind of forces gathering against humanity. Before the radio went off, I heard a few partial answers. Maybe a few individuals had answers like mine. I thought I could hide until things quieted down, but I waited too long. Now the ice that I thought might never reach here has come for me. You've come for me."

He looked at the girl again. "Did you say something?" Then he laughed. "Of course you didn't say anything." He picked up his bundle of sticks and paced off one hundred meters from the face of the glacier, pushed a stick into the snow, and then, as the world began to be obliterated by the universal whiteness, he headed back toward the farmhouse, inserting a stick into the snow every five meters until they ran out.

Next morning the snow still fell from the sky so thickly that Reed could not see the barn. By mid-day, however, it let up long enough for him to reach the face of the glacier to check his markers. Only the top thirty centimeters or so stuck above the snow, and only a few of them remained. He estimated that the glacier had advanced another one hundred sixty meters. If that rate continued, the ice

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would reach his house before it slowed and stopped during the brief summer. He couldn't clear away enough of the snow before the blizzard enclosed him again to see if the girl was still there in the ice, still all right, but he was sure she was. He had come to count on her.

The snowstorm lasted for almost a week. He had to climb out a second-story window to shovel snow off the roof before it caved in from the accumulating weight, and he had to tunnel through the snow, now five meters deep, to reach the barn. He had rigged a wood stove there to keep the chickens from freezing, and it, like the chickens, had to be fed. Fortunately, the temperature was relatively warm; the gulf air bringing the moisture up from the coast always kept the temperature from falling more than a dozen degrees below freezing.

He was profligate with firewood now. This would be his last winter, he knew, and what he did not use up the ice would take. If necessary he could move the remaining chickens into the farmhouse cellar and use the barn for firewood. For him there would be no more farming, no more hunting, no more caring for animals and fowl; all that was left was dying.

Sometimes during the long nights he dreamed of Catherine again. She asked him why he stayed in the land of death, why he did not go south where there was life and hope, no matter how difficult. He answered, "Why, Catherine, I can't leave you and the children," for in his dream they still were alive but for some reason could not go with him. She chided him then for the sin of self-destruction; she always had had an unshakable faith in God, even when the winters grew long and bitter, perhaps even when she was being abused by the brigands after they had killed her children. He did not share her faith, but he never mocked it either. "I'm only staying where I belong," he replied. "If God wants to save me, he can spare this valley or stop the ice from covering the world."

Sometimes little Billy would be with Catherine, clinging to her hand. "But, Daddy," he said, "if you're waiting for God to take you or spare you, why do you keep up the house and the barn and the tools and everything?" And he said, because children needed to know these things, "That's what a man does, Billy."

Josie never appeared in his dream. He thought that was his punishment for loving her best.

On the sixth day the sun finally came up. It was a wintry sun, pale and chilly, and the temperature had dropped during the night. His thermometer read only to minus thirty degrees Celsius, and he

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knew it was colder than that. He was not surprised: he was living in the Arctic; it had come down to engulf him.

As soon as he had stoked the fires and fed the chickens, he set off for the glacier. It was difficult travel, even on snowshoes. The last layer of snow had turned to powder as the temperature dropped, and when he fell his arms and shoulders, sometimes his head as well, would go deep into the drifts, and he had difficulty regaining his feet. Sometimes he had to dig himself out with the shovel he had brought with him to dig his way down to the girl. The snow had covered everything; the hills were impossible to distinguish from the drifts. If he had not known the valley and had the sun to guide him, he might have become lost in this silent, glittering wasteland, where nothing moved, nothing live.

The wind was almost still, but even his slow passage through it brought the cold biting through his skin until he pulled a cloth mask over his face and the snow glasses he had made over that. He wished he had learned to ski, but it was too late for that.

By the time he reached the spot where he thought the glacier should have been, it was almost mid-day. He looked around at the mounded snow, trying to distinguish a casual drift from an indication of a feature beneath. But there was no clue to the location of the glacier. For a moment his heart felt as cold as the wasteland around him, and then he realized that all it took to find the face of the glacier was work.

He dug down through the snow—some five or six meters in places—until he reached ice. The lowest, compacted levels of snow were almost ice already; that was the way the glaciers grew. He dug down half a dozen times, each time five meters farther south, and he was getting tired, a little desperate, and a bit faint with the cold and the effort when he found the excavation going deeper than five meters, deeper than six meters, and he moved a little north and found the face of the ice.

The glacier was at least a kilometer from the place where he judged the entrance of the valley to be. He shoveled his way down the face, leaving plenty of room for the ice to move if it chose to do so, and cutting steps in the snow as he went. It was hard work on top of everything that had gone before, and his ears were ringing from the effort by the time he reached the bottom. There, however, like the Holy Grail, the figure of the girl waited for him.

He sat down to rest and leaned back against the snow, feeling the sweat freezing in his clothes even though he was protected here; he knew he should not stay here long if he wanted to get back to the

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farmhouse. He was very tired; it was not certain he could get back; he was not sure he wanted to. He was comfortable here, almost as if he and the girl were alone in a darkened room lit only by the reflection of the sun from the snow at the top of the excavation. In the relative darkness, the face of the girl was not as clear, almost as if she were receding from him. But he remembered what she looked like. He was comfortable with her now, and he thought she was the most beautiful woman he had ever seen.

He knew that this might be the last time he would see her, one way or another; even if he gathered the strength and the will to return to the farmhouse, the next snow might obliterate the glacier beyond the reach of anyone's efforts. For now, though, it was just the two of them, together, in the icy room. He had someone he could talk to about the events that had happened to him and to the world.

"It's been a while," he said after his breathing had slowed. But he was still light-headed. "I told you about the neighborliness of people at first. It didn't last." The snows and the glaciers kept descending. Food became scarce as growing seasons got short and undependable. The panic began. The steady trickle of movement south became a river and then a flood. "When conditions got bad, nobody wanted the refugees." Fences were thrown up. Armed guards turned back those fleeing the cold. If they tried to sneak through, or rushed the barricades, they were shot down. Some got through—there were troops and arms north of the fences—and fanned out across the countryside.

"Walled cities returned," he said. "Citizens guarded them by day and night, frantic to keep what was theirs, never thinking that they, too, might have to head south in their turn. Some governments fell apart. Soldiers and police formed their own protection businesses. Others began to band together for their own protection and to preserve their stocks of food and weapons."

—Why didn't you go south?

"I couldn't see killing my fellow humans to make a place for myself and my family," he said. It would have come to that. On a larger scale it came to that: the Soviet Union took over the Middle East, but when it tried to move into Africa, U.S., British, French, and German troops fought the Soviet armies, not so much to protect the African countries as their own warm-weather rights. The Soviets withdrew when the Chinese attacked along their common border. Eventually the Soviets collapsed, and what was left of the Chinese soldiers battled through China and into Indo-China followed by hundreds of millions of Chinese, most of whom soon starved.

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"Here in this country, most attention was on the invasion of Mexico. By the time organization and communication broke down, parts of some groups had battled their way as far south as Brazil." The Japanese took over the Philippines and fought the British for Indonesia. Australia moved into New Guinea and Micronesia. The population of India slowly drifted south, dropping along the way from starvation and disease. The remainder huddled in the southern provinces while their leaders conquered Sri Lanka.

"Here and there pockets of sanity remained. Scientists and engineers kept a few northern cities free of ice for a few years by sprinkling powdered coal on the snow to encourage melting, sometimes buying enough time for the population to move underground." Pennsylvania and West Virginia coal mines provided natural spaces for underground living; all they needed was tools, food, furnaces, hydroponic gardens, and air-handling equipment. In Montana and Wyoming they could dig caves in the rock near supplies of coal, or take nuclear reactors underground. "But who knows what they will be like when they come out—if they ever come out, if the ice ever retreats."

—Humanity must survive!

"Sometimes I wonder why," he said. The same things must have been happening in the southern hemisphere, but except for Australia and South Africa, the news had been almost non-existent. It was reported that the Antarctic icecap floated out over the ocean and occasionally broke off in big icebergs that littered the sea. They must finally have frozen together. "North and south, civilization collapsed in the space of thirty years."

—There's still time to leave.

By now he had lost track of what was thought and what was spoken. Here in this cold, white room, reality was shattering around him like frozen light. "I've lost whatever reason I had to live," he said. "I won't join the savages scrambling to survive on any terms. Most of them are doomed to death by starvation, disease, or violence."

—It doesn't have to be that way. Conditions are better now. Order is beginning to emerge. They need your skills. They need your courage and determination. You can stay alive; you can help others stay alive.

Death, he thought, was not black, but white. It came glittering and shining and cold. "I'd rather stay here with you," he said. He held up his shovel. "I could carve out a place for myself beside you, and we could share eternity together, frozen side by side, going south

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in style."

He imagined how it would be as the snow filtered in around him and he reached out for her through the ice, the warmth of his hand melting its way to her until he held her frozen hand in his. Then he would be satisfied.

—No! I am dead, but you are alive.

Just for a little while, he thought.

—It is the business of the living to stay alive. Humanity has been in difficulties before. People haven't given up. If they had given up as easily as you, humanity never would have got out of the jungles.

No! he tried to say. My roots are here. My ancestors bought this place for me with their labor and their dying. This is where I belong.

—You've got feet. Use them! Go south! Survive! Wait until the glaciers retreat, whether it's a hundred years or ten thousand! Don't forget! Come back to a world scoured clean, ready to be built on again! Come back then and make it a better world! You can if you don't forget! If you struggle! If you survive!

He had closed his eyes against the brightness, but now he opened them. Afterward he knew she hadn't spoken. The voice had come from inside him. It was the same voice he had heard when Catherine spoke to him in his dreams. It was the voice of his ancestors going back through the eons of struggle to stay alive against fire and ice, drought and flood, plague and hunger and all the other animals that were stronger and swifter and more deadly. It was the ancient voice of humanity demanding struggle, demanding survival.

He said goodbye to the girl in the ice and climbed from the pit he had dug and began his long journey home.

The next day he began work on the sledge. When it was finished he loaded it with tools and weapons and provisions, and finally his books. He made one last trip, not to the glacier but to the hill where his family was buried. By some kind chance it had been swept clear of snow. When he returned he started south. He did not look back.

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IMPROBABLE BESTIARY: The Missing Link

I do not think the Missing Link
Will ever take up pen and ink
And sign an agreement which says that he *might* show
Himself to the crowd at a rock concert light-show.
(I *know* he's not slated for Carson's "Tonight Show"!)
A whimsical loner is he.
He'll refuse to embark on a show-biz career;
You can offer him pretzels and offer him beer,
And say "please" on your knees for the rest of the year.
You can book him in Vegas: he'll never come near,
And he'll *never* be seen on TV . . .
For if he should appear
On a show, then I fear
That he wouldn't be Missing, you see.

I do not think the Missing Link
Is polka-dot or striped or pink
Or two-tone magenta, or purple, or puce;
I know for a *fact* that he isn't chartreuse!
Or green, tangerine, or . . . oh, heck: What's the use?
It might even be that he's *plaid!*
He avoids all the sculptors who ask him to pose
And the agents who promise to publish his prose,
And he flees from the pleas and entreaties of those
Who wave Kodaks and tell him to take off his clothes.
And he *never* has guests, I might add . . .
For if he should disclose
Where he lives, I suppose
That he wouldn't be Missing, by gad.

—F. Gwynplaine MacIntyre

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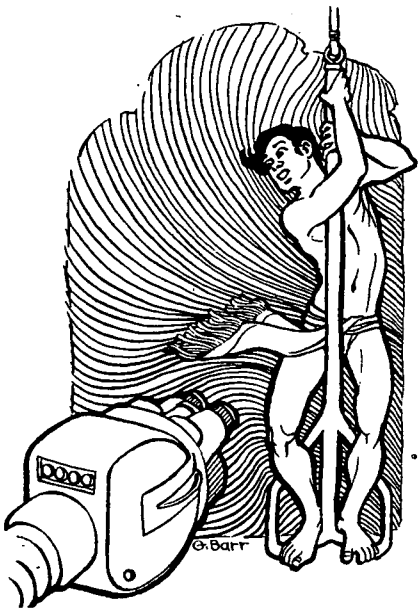
OUR MAN IN VULNERABLE

by Sharon Webb

art: George Barr



Be warned: Mrs. Webb has Been At It Once More . . . !

Anthony Roebuck stared at his agent in horror. "They want me to *what?*"

"They want you to go on location," said Maxim Perkwell, handing him the contract. "Sign here."

"They're crazy. What do they think this is? The twentieth century or something? Impossible."

Perkwell narrowed his eyes. "This could be the biggest story of the century, and the High Koda asked for you. Not Smith, not Xoc, you. And *you* are going."

Dismay crossed Roebuck's face, then a crafty look displaced it. "Only to the edge of the chasm then. Imagine it: The three-vees pan the frozen edge of the crevasse, then pause. Far below, we see a tiny speck. Then up ten. Zoom. We see the holy Koda sitting on his Royal

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Dumka. Silence. And then from far away the sepulchral voice of Anthony Roebuck begins the interview. . . ."

Perkwell glared. "The Koda wants you down there with him."

Faintly: "In Vulnerable Chasm?"

"In Vulnerable Chasm."

Roebuck shuddered. "I won't go."

"It's only for the big scene. The rest of the interview with the Kodaslan you can do remote. Think of it, man. The biggest interview of the millennia and Koda hands it to you. Xoc would give his left bulge to do it. And Smith— For the chance to interview the being who ended war through psi power, Smith would turn his mother in to the Galactic Revenue Service."

"I can't," said Roebuck.

"In the name of Credit, why?"

"I'm afraid of heights."

"But it isn't a height," said Perkwell. "It's a depth."

"It's a hole, dammit. A deep frozen hole on the most miserable planet of the sector; and I will not go down there for you, or Koda, or anybeing else."

The two sat in silence for a minute, then a sly look came into Perkwell's eyes. "It's too bad, isn't it, when a fellow loses his nerve. I can remember the good old days." He sighed and glanced sidelong at his quarry. "Remember that brilliant piece you did on the pubescent Antareans? I'll never forget what you did in *Mammary Yet Green*."

Roebuck studied his fingernails.

"And then there was the piece on the grazing gastropods of Gastropia, *Fantastic Forage*. By Jupiter, I thanked my lucky star that I represented such genius then."

Roebuck's eyes widened slightly.

Perkwell warmed to his task. "Yes. And then that Indian piece you did—right after the galactic garment district thing, *Enjoy Stiff Felt*. When you interviewed the great Sioux, Sun Cow Fun, it brought tears to my eyes."

"I, Roebuck?"

Perkwell nodded gravely. "You. Always you."

"Well— Since you appealed to reason—"

Perkwell beamed. "That's my *man*." He gently closed Roebuck's fingers over the contract.

"But only for the big scene—"

"Right. Sign here."

Roebuck signed. Then a startled look came over his face as if he

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had just thought of something awful. "How do I get down there? Into the chasm?"

"No problem. You can ride down on the scissors."

Roebuck's anxiety level rose. "Hanging on those? Out in the open?"

"It'll be just fine. Oh, and one other thing— The Koda expects you to wear a loincloth."

As the contract sailed at his head, Perkwell caught it deftly.

It was nightfall. Roebuck stood next to the scissors at the edge of Vulnerable Chasm. A frigid blast of wind rippled the fringe of his loincloth, chilling him to the marrow.

As he stared at the crevasse, he felt shaken to his very foundation. He had never felt so small, so alone.

The distant lights of the Empire served to isolate him even more. Then suddenly the trouper in him came to the fore and he was "on." With a wave to the three-vee eye, and with a jaunty step, he swung onto the gorge scissors and plunged into the icy chasm of *Psi Ends Friction*'s megascene.

THIRD SOLUTION TO PARALLEL PASTS (from page 87)

Said Jock McBrown to Tam McSmith,
"Come on, ye'll pay a braw wee dramlet;
Bacon's my bet—the proof herewith . . .
He called his greatest hero—**Ham**let."

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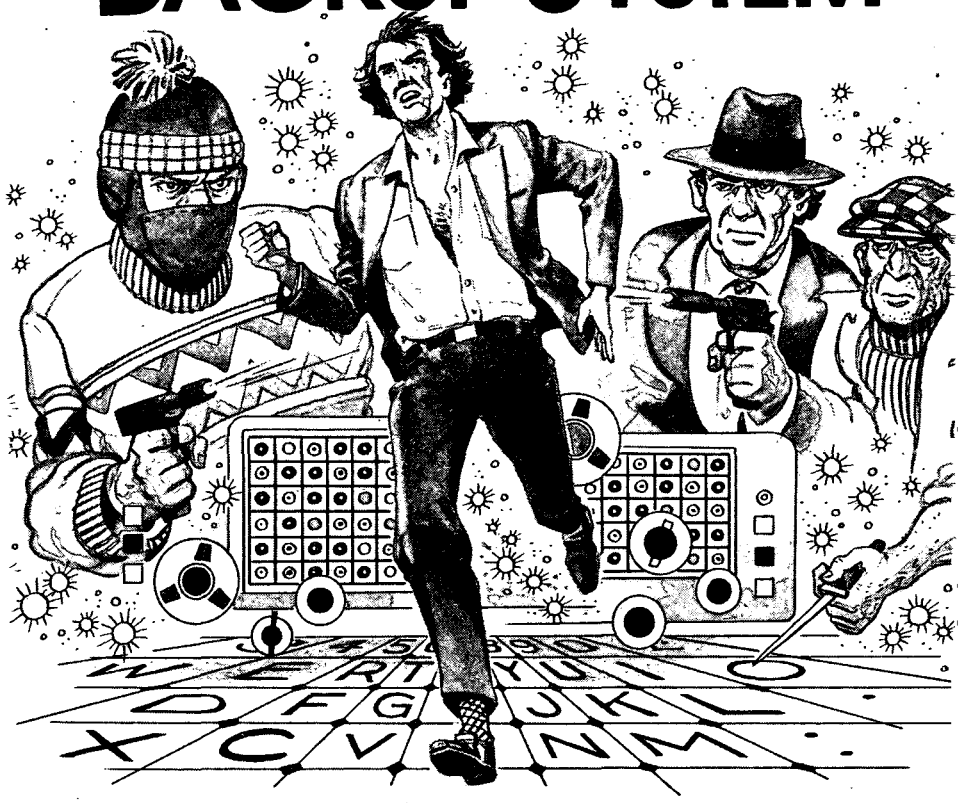
BACKUP SYSTEM



by F. M. Busby

art: Alex Schomburg

F.M. Busby once helped run a world science fiction convention (Seattle, 1961), but he reformed. He was also once an electrical engineer, but he retired. He now writes full time, which, we think you will agree, is the only suitable occupation for someone who can produce stories like this one.

When my office turned into an airborne 747, I figured Sam was up to something. It was the day before that I'd flown back home

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from New York. I looked at my watch; the afternoon had progressed to 3:20. At that time, a day earlier, we'd been over the Rockies. I leaned across the slim woman to my left and looked out; sure enough, the Rockies were there. I pressed the watch's calendar button; it read the day before. And to top the whole thing off, the slim lady—as well as the teenager to my right—were the same ones I remembered. Neither of them appeared to notice anything unusual. Well, that figured, too.

My friend Sam is the only person I know who edits events. Which is to say, he does something in his head and the past changes; the alterations, of course, also reflect into the present and future. Neither Sam nor I knows how he does it; he's never explained it twice the same. "It must have something to do with science," he said once. "And you know I always flunked science."

When Sam fiddles with history all by himself, he's the only one who remembers what things were like before he changed them, if you see what I mean. Sometimes the discrepancy in recalls gives his conversation a certain opaque quality, but sooner or later, with luck, he sorts it out for me. I've learned to wait; it pays.

Once, though, to help him edit events at the immediately-recent level, Sam modified an electronic calendar. He added a grey button which he called the Backspace Key. When he punched it, the preceding twenty-four hours replayed—sometimes for better, sometimes not. Sam let me try it myself, one time, and thereafter when he used it I kept my recalls of the cancelled versions. Unless he was too far away when he did it—for instance, when he burned the gadget out, needing fifty-eight auditions of one specific day before he found an alternative that didn't start World War Three, he was in London. Out of my range, apparently, because I don't remember those reruns at all.

But this one, riding the 747 home and then being at the office most of the following day, I did recall. Which told me two things: Sam had a backspacer working again, and he wasn't too far from my part of the country.

As before, the plane landed safely. As before, I found my car on the top level of the parking garage, wormed my way down the ramps and outside, paid, and drove home. As before, my wife Carla greeted me, finished feeding the children before we bedded them down all comfy, then greeted me more fully. As before, or maybe even a little better.

Over the next few days, for no conscious reason I kept expecting

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Sam to visit. Especially after the day when I was driving home from work, thanking God (in the traditional mode) that it was indeed Friday, and suddenly found myself back into Thursday when I'd had to work *late* at the office. Whatever Sam was doing, that time, I didn't appreciate it much.

When he did show up, it was a time when Carla had taken the kids to Sacramento, visiting her grandmother. Despite the six-pack of canned Martinis he was carrying, I hardly recognized him. Short hair, no beard, conservative but nondescript clothes. The blue eyes and strongly marked eyebrows fit; the thin nose, high cheekbones and narrow jaw did not.

So, what to say? "Hello, Sam" didn't work. But no more so did "Who the hell are you?" I paused; he lit a cigar that smelled like a five-alarm fire in Akron, Ohio. Sam, all right. I unlocked the front door and motioned him inside with me, and settled for asking one question. "Why?"

Not until we sat in my kitchen would he answer. Not until he'd opened a Martini, laced it with his "zouch" powder, stirred it with his cigar and thus given that fusee the added bouquet of arson in the chicken coop. Then he said, "The face. It bothers you?"

My expression, I suppose, admitted as much, but I repeated: "Why?"

Even grinning, Sam can look deadpan. "I edited it, is all."

I said, "Sure. Could happen any ol' time." My breath came less easily than I would have liked. "But also there's the time hiccups. Twenty-four-hour backups. I've *noticed*, Sam."

Seldom does much of anything disconcert Sam, but now I saw him gulp his Martini and forget to zouch its replacement as he opened it. "Peter the Wolfless—" He paused, and cleared his throat. "Some people keep trying to kill me. The who and why of their endeavor elude me. But—"

I cut in. "But you have the backspacer going again, don't you? Or a new one, rather. What's the connection, Sam?"

Still, from him, no words. Until I raised an eyebrow; that move triggered his answer. "The backspacer, yes. But not the same as before. I said, people try to kill me. Sometimes they succeed. When they do, that's what operates the backspace."

I blinked, twice. "You mean it's not volitional?"

"Volitional? Look, Pumpkin Eater—please don't use big words on me when I'm tired."

"On purpose, I meant. You're saying, it just happens?"

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"*Just* happens? When I get *killed*, I said. That's 'just'?"

Killed. The word began to get through to me. "You've died, then?"

"Over and over. I lost count."

He looked sad—and lost, in a way I'd never seen him before. "Sam?" Half-scowling, he peered up at me. "Maybe you need some zouch." His expression brightened. He dumped powder into his Martini, stirred it with the unlit end of his cigar, sampled both drink and smoke, then nodded. I said, "Dying, Sam. What's it feel like?"

He shrugged. "How should I know?" Overriding my protest, he continued. "The gadget—well-concealed, so no one could find it, much less deprive me of it—is keyed to my life force. Which sounds good; I wish I knew what it meant. Brainwaves, heartbeat, something. Go ask a doctor."

Maybe I would, if I could figure what to ask. "You don't feel it, then? The dying?"

He drained the Martini, got another, and this time zouched it without need for reminder. "Up to a point I do. Like getting shot; I know how that feels. Boy, do I ever!"

"How, Sam?" I was beginning to feel ghoulish, but curiosity wouldn't quit.

"Just a big *whoom*. You ever pile up a car? All the impact comes through as noise; you hear it but don't feel it. Well, it's a lot the same." He wiggled a shoulder. "Then when the real feeling starts to hit, I go blank. All at once it's yesterday again, and I have twenty-four hours to figure how to be someplace else."

A little numb, I was feeling, and not from any measly two beers. "They stay with guns, do they? These killers, I mean?"

"Pretty much. Knives once, which I don't recommend." I'd never seen Sam shudder, but now he did. "And twice poison, which isn't so bad, once you get used to it."

"But, Sam—you're still editing, aren't you? Eventually you'll beat this threat." I paused. "You don't know who it is?"

Gesturing negation, he drank. "And if I did, Peter of the unmitigated innocence, still best that you do not. And that you forget the backspacer's existence. For if *they* learned of it . . ."

"Huh? Even if they did, what could they do about it?"

His Martini was empty; standing, he moved toward the fridge. "In their shoes, I know a way I could get me, backspacer or not. And if *I* can think of it . . ." He reached the refrigerator just as the back door burst open. In charged three men wearing ski masks and bulky blazers; their guns fired. A gasoline bomb hit the far wall and my kitchen bloomed flame. What splattered against the refrigerator

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was the top of Sam's head. *Fire and death . . .*

Then, suddenly, it was the day before.

I was upstairs, putting away some clothes I'd brought from the dryer, and I almost threw up in the bottom drawer before it came to me that Sam's backspacer had *cancelled* the horror I'd seen. Leaving all the mismatched socks for later, I went down to my undisturbed kitchen, opened a beer, put coffee on to brew, and sat to do some confused thinking.

Even if I'd known where Sam was, no point in calling him. He of all people would be planning to avoid the next day's previous events, if you follow me. So what *could* I do?

Warn Carla to stay away, maybe: logic said Sam wouldn't be here on tomorrow's rerun, but with Sam you never know for sure. So I called Carla. No problems; young Glenn had a touch of flu, and Carla's grandmother didn't think he should travel just yet.

Sam took care of my misgivings; he turned up that same day, this time, rather than the next as before. Arriving home from work I found him sitting at the doorstep, working on his second Martini. His first empty can, crumpled to take up less space in the recycling bin, sat neatly beside him.

I parked my car. Walking over to say hello, I realized Sam had changed again. Still clean-shaven and short in the haircut, but now wearing his original face. Approaching handshake distance, I stopped. "Sam—what's going on?"

He waved a hand—the one not holding the Martini, so no spillage. "The editing. I was doing it wrong. Rather than walk around with a strange face—one, mind you, of which I was not all that fond—I edited the records-gestalt to reflect that face. Thus leaving me this one, which I much prefer, for my own use."

"If you say so." We went indoors, to the kitchen where our longtime programming took over. We sat—Sam with his Martini zouched and cigar fuming, me with a beer and much unsatisfied curiosity. "You have it whipped then, do you?"

He smiled. Not the tense grimace of our latest pre-canceled meeting, but not entirely relaxed, either. "Not whipped, exactly. But leaning at a better angle, maybe. You see—"

He stopped, eyes gazing at something I probably couldn't even imagine. "Sam?" Blinking, he came back to the here-and-now. "What *are* you doing?"

Smile, frown, shrug, and blank stare. "Oh, this and that. Do you

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recall why Adolf the Snarling failed with World War Two?"

"Two? Sam, there was only one World War—'the war to end wars,' remember?"

"Well, yes," he said. "*Now* that's true," and once again I realized that Sam most likely remembered more versions than I could. "But do you know why?"

I didn't; I admitted it. Sam said, "Bunions."

"Bunions?"

"It is impossible," said Sam, "to do a workmanlike job of goose-stepping with bunions."

No real answers, that evening, would Sam give me. The threat to his life he would not mention, much less discuss. He spoke of alternates, of changes. "It was necessary," he said at one point, "to ameliorate Guinevere's frigidity." He shrugged. "Nothing personal, you understand. But in the interests of Malory, Tennyson, all that crowd . . ."

"I understand." Well, if you can't lie for a friend, who *can* you lie for?

"Sure you do." Sam wiggled his cigar; it escaped his grasp and rolled to rest safely on the tiles before the fireplace. It would keep. Sam blinked. "I should go now."

"You could stay. There's room."

"As always, and I thank you." He drained his Martini. I hadn't kept count, but his gesture said it was the last one. "No, Peter." He waved the universe a salute. "Somewhere out there, avidly awaiting my custom, is a hotel."

"Sure. You want a ride?"

"Ah, no. Also out there is a cabbie, bound by fate to convey me where I must go, where I am needed. Expected. Foreordained." Arms spread wide, Sam rose to his feet. "And who am I to tamper with the karma of all those people?"

Then he fell on his face. Even Sam has his limits.

I got him up onto the couch, removed his shoes, loosened his belt, and covered him with the plaid blanket that had once aided me to endure football games in a cooler clime.

I turned to leave for bed; eyes unopened, he spoke. "You know, Peterkin—I've done good things and bad things. Assuming there is a God—and in my own right I feel secure enough to allow the existence of Someone superior to me—do you think maybe He grades on the curve?"

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Next morning, Sam refused breakfast. Not a matter of hangover, he said. "It wouldn't last me, is all, so why waste it?" Then, "Mind if I use your bathroom?"

I suppose I gawped. "Mind? Why should I?"

"To take my cyanide pill, I mean." He made a pawing, negating gesture. "You wouldn't want to watch. There won't be any mess, though. I need to do yesterday once again, is all."

He went upstairs fast. Before I could get sorted out to go after him, it *was* yesterday. Upstairs, I checked. Sure enough, no mess.

This time I stuck around and got all the socks sorted out.

For a time, then, things settled down to a mild grade of bounce. Carla brought the children home and went back to work. Without replays the days passed, so I knew Sam wasn't getting killed any more, lately. He might still be editing events in his older fashion, but on that I could never be sure. I thought the Czar of Russia, visiting on a good-will tour, should maybe be Ivan rather than Alexander, but I hadn't been paying all that much attention. And if I didn't notice, who else would?

One bit, Sam blew. I hauled a stack of old newspapers out of the basement, to take in for recycling, and they had our most recent presidential election going opposite to the way we now know it. Like "DEWEY BEATS TRUMAN," so long ago, but for real. So I knew Sam had to be editing in a hurry, because when he does that, sometimes he gets a little sloppy.

If any others caught the discrepancy, they kept shut up, same as I did.

The next time shuffle, some days later, was a real oddball. Thursday afternoon bucked back to Wednesday, which lasted only a few minutes and then we all hit *Tuesday*. I jittered up a storm, which lasted through the whole rerun until Thursday passed the initial hiccup and kept going, without particular incident. After that, whatever else may have been happening, Sam wasn't getting himself erased. Unless of course his misgivings had come true, and the killers had managed to make it final.

I watched the news; things seemed to be moving, well enough. After years of palaver the Union and the Confederacy ended their 125-year separation by signing the Reunification Treaty. Kaiser Wilhelm IV eased Western European tensions by granting joint tenure in the Saar to the Fifth Republic; the French accepted graciously. The newly crowned Henry IX of England pulled his troops

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out of Australia, giving the rebels their independence by default. Well, as Prince of Wales the young man had never shared his father's imperialist leanings.

So the news didn't tell me much that was new, but I couldn't knock it. Even the government of the Reunited States was behaving halfway civilized.

Sam, though, I did still worry about.

He came by, one evening—looking tired and not carrying his usual Martini six-pack. He had it with him, I think, but inside already. In the kitchen he drank beer and coffee, answering no questions except with obliquities that bounced off me. We kept our voices down, so as not to wake Carla or the kids. Finally I said, "Sam, are you safe now?"

He puffed on a cigar that hinted of armpits being tested to destruction. "Don't ask all at once. For now, classify me, Petros, with the Thane of Cawdor—whose raveled sleeve of care, you may recall, needed a lot of knitting-up by way of sleep. Kapish, paisan?"

"Oh, sure." Shakespeare. Macbeth. Sophomore English, in high school. Or maybe Hamlet; I wasn't sure, but why argue? I got Sam fixed up on the couch, went upstairs, and slept.

The next day, he told me some of it.

They caught Sam with a trick taxicab—on the inside, no door-handles, and when he fussed about it, a jolt of woozy-gas. They took him to a place he didn't know, by routes he couldn't keep track of, and hustled him inside a great hulking building and down a lot of stairs. In a small, damp-smelling room containing one canvas cot and lit by one dangling overhead bulb, they searched him—and found nothing worth taking. He wasn't armed; the two goons didn't seem to want his money or credit cards or ID. They didn't find the backspacer because you don't get the wishbone without carving the turkey, and the healed scar from the small cylindrical implant wasn't prominent. Nor labeled, either.

They tied him up, hands behind him, and put him on the cot. When they left the room, they turned out the light and locked the door. The dark didn't bother Sam. The situation scared him a little but not too much, because the goons hadn't found his cyanide pills, either. There was one small tablet inside the tip at each side of his shirt collar; he'd read about that gimmick in a spy thriller, and apparently the goons hadn't. If he couldn't get at one of the pills with his hands, he could simply salivate and chew, right through

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the cloth. At least, it worked in the book.

For now, though, there was no hurry. Well, he was beginning to regret having had quite so much coffee with lunch, but as yet the problem wasn't *that* urgent. Sam could wait, so he did.

When the door opened and the light came on, he estimated he'd been there about six hours. Now his captors numbered three; besides the big blond goon and the big redheaded goon, Sam saw—blinking to adjust to the sudden lighting—a swarthy little wimp with a ragged, raunchy beard. That one ordered him untied, and Sam's first move was to sneak a look at his watch. So much for his great ability to estimate time: he'd been in the dark all of ninety-six minutes.

Never mind; he still needed a rest stop, and said so. Red and Whitey laughed, but the wimp nodded and made a gesture. Red said, "Okay, Mister Abdul" and led Sam to a rather crummy facility. And then back up some of those stairs, to a sort of office. It was no warmer nor drier-seeming than the little cell, but it did have chairs and a lot more lighting. Particularly the lights surrounding the chair Sam was shown to: there should, he thought, have been color-TV cameras, but there weren't.

First, though, before Red and Whitey tied Sam to that chair, he was searched by Mr. Abdul. Mr. Abdul had read the book, or maybe written it; he found the cyanide pills, and took them away from Sam. Sam noted the time—for timing was now vital.

Then the interrogation began.

"They interrogated you?" I said. "What about?"

"I don't know. They didn't say. Rather, they assumed I knew all about it, and I didn't. They asked where and when I'd met with people I'd never heard of, and what was decided at such meetings." He shook his head. "A strange lot, those three."

There was a great deal more hitting than Sam would have preferred, but after Whitey slammed him a solid one over the ear, his head began buzzing and he quit feeling the impacts. As he'd said once, about piling a car, it all came through to him as noise. Not pleasant, but nothing he couldn't endure.

Then there was a time when people talked, and it seemed they had to be someplace far away because he couldn't quite make sense of the words.

Well, part of it he got. The wimp: "—my specialty, so if you do not want it used, why am I brought here?"

Whitey shaking his head. "Mr. Abdul, I'm sorry, but torture the

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way you use it—well, it's not *authorized*. Maybe when Mister One gets here—"

"And that will be when?" Sam couldn't see clearly, whether Mr. Abdul was shrugging, but he sounded like it. "Meanwhile I waste my time . . ."

Whitey definitely did shrug; no doubt of it. "I *said* I'm sorry. But it's orders. You want to go on like we are?"

Mr. Abdul spit, not quite on Whitey's shoes, but close. "Why to bother? Put this one back. While we wait for your Mister One." He turned away. "Will *someone* make me coffee?"

Then Red took Sam back down to the cell and tied him up again. This time he left the light on.

But that was when Sam began to get *really* scared. That maybe he wouldn't get killed in time to save him.

"I don't understand," I said in all truth.

Sam leaned forward. I'd never thought people's eyes ever actually "blazed," but Sam's gave a good imitation. Though he showed no wounds, his shrug mirrored agony. "Don't you get it, Pete?"

Tied and helpless, Sam waited while time elapsed. What scared him the most was that maybe Mister One wouldn't get there in a hurry, or that when he did, he wouldn't be bloodthirsty enough, right away. Because the backspacer was only good for twenty-four hours, and . . . Eventually, Sam drifted into nervous sleep.

Somebody shook him awake; it was Whitey, and again Sam was taken upstairs. In the office room a fat man had joined the group, and from newsclips Sam knew the real identity of Mister One.

His hands were free; he'd had a sneak glimpse at his watch and time was running out. There was only one way to play it, and Sam had seen a lot of spy movies, so he knew how. Swallowing whatever was trying to hiccup free of his thorax, Sam cleared his throat and pitched his voice to be as harsh as he could manage.

"You're dead, fat man! In five minutes this place goes up, and it takes you longer than that to tie your shoes."

He had Mister One figured right; the man shot Sam in the head. *Whoom*-impact, and then a blur and some pain, and then Sam was tied up on that cot again, twenty-four hours earlier.

He didn't know how much time he had, but he knew it couldn't be much, so he chewed on his shirt collar and died, and bought himself another twenty-four hours, starting *before* they caught him.

And then he could let loose of the sickening fear—that if he'd been

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held for *more* than a day after Mr. Abdul took the cyanide pill away, Sam would have no way out. None at all. The backspacer could only put him back, over and over again, onto the road to certain death.

Probably I turned pale. "Sam—you mean *forever*?"
"Not exactly. Sooner or later, the batteries would wear out."

Backspaced twice, Sam was. Editing events means working with causation; until he knew who was after him (the why of it, he never did learn), his unique talent was useless. And to edit, he needed some leisure and privacy. But now he had both, and now he knew the identity of Mister One, plus the flamboyant history of that man's mother, a well-known movie star. So Sam edited, and the woman became a nun at seventeen, and Mister One never existed.
There went a lot of good movies.

"But who were they, Sam? The outfit that tried to kill you?"
He looked startled. "Why, the CIA. Who else?"
That's all he would say. But he has to be either kidding or mistaken. Because why would the Chocolate Importers of America go around killing people?
All that editing, I suppose, can mix a man up.

INFINITE MISS

We've all heard of that "Lady Named Bright,"
And her FTL trip on that night,
But the story lacks class,
For her infinite mass
Would have proved a most *singular* sight!

—Charles J. Holst

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THE SF CONVENTIONAL CALENDAR
by Erwin S. Strauss

October is a big month for con(vention)s, especially in the western part of the continent. Enjoy a social weekend with your favorite SF authors, editors, artists and fellow fans. Contact a con in your area soon. When writing, send an addressed, stamped envelope (SASE). For a longer, later list, an explanation of cons, and a sample of SF folksongs, send me an SASE at 9850 Fairfax Sq. #232, Fairfax VA 22031. (703) 273-6111 is the hot line. If a machine answers, leave your area code number and I'll call back at my expense. Look for me at cons as Filthy Pierre.

RoVaCon. For info, write: **Box 117, Salem VA 24153.** Or phone: **(703) 389-9400** (10 am to 10 pm only, not collect). Con will be held in: Roanoke VA (if city omitted, same as in address) on: 2-4 Oct., 1981. Guests will include: Algis ("Rogue Moon") Budrys, James ("Warm Worlds & Otherwise") Tiptree Jr. (Alice Sheldon), Freas, the Prestons, Dellinger.

NonCon, (403) 233-3390 (days), 244-9462 (eves). Calgary, Alta., Canada, 9-11 Oct. Larry "Ringworld") Niven, Orson Scott ("Planet Called Treason") Card. Masquerade.

StarCon, (806) 747-0669 or 799-2835. Lubbock TX, 9-11 Oct. Robert ("Bug Wars") Asprin.

TallyCon, (904) 224-0633. Tallahassee FL, 9-11 Oct. K. & P. Freas, R. & Wendy ("Elfquest") Pini, Joe & Jack Haldeman, C. J. Cherryh, Ben Bova, W. A. ("Bob") Tucker.

BoucherCon, 2009 S. 93rd, W. Allis WI 53227. Milwaukee WI, 9-11 Oct. The mystery fan's WorldCon, named after mystery/SF writer Anthony Boucher. Not SF, but overlaps SF fandom.

Worlds Beyond, Box 4042, Falls Church VA 22044. Near Washington DC, 9-12 Oct. Sucharitkul, Hal Clement, Dave Bischoff, R. Rogow, Bob Lovell, A. D. Foster, S. Stiles, Mike Jittlov.

RocKon, Box 9911, Little Rock AR 72219. 16-18 Oct. Fred ("Berserker") Saberhagen, Asprin.

ASFi Con, 6045 Summit Wood Dr., Kenesaw GA 30014. 23-25 Oct. Bob ("Nightwings") Silverberg, Michael Bishop, Gerry Page, Hank Reinhardt, Joe Siclari. Banquet, Hearts games, Dr. Who.

MapleCon, Box 3156 Sta. D, Ottawa ON K1P 6H7, Canada. 23-25 Oct. J. Vinge, Lynn Abbey.

MileHiCon, Box 27074, Denver CO 80227. 23-25 Oct. Theodore (90% of Everything is Crud, "More Than Human") Sturgeon, Bob ("Sandcats of Rhyl") Vardeman, Tom Digby. Masquerade.

World Fantasy Con, c/o Dark Carnival Books, 2812 Telegraph Ave., Berkeley CA 94705. (415) 845-7757. 30 Oct.-1 Nov. Alan Garner, Peter Beagle, B. Frood, Karl E. Wagner. Banquet.

OryCon, Box 14727, Portland OR 97211. 30 Oct.-1 Nov. Fred ("Gateway," "Cool War") Pohl, Ursula ("Lathe of Heaven," "Dispossessed") LeGuin, F. M. ("All These Earths") Busby, Steve Fahnestalk, M. A. ("Waves") Foster, Kennedy ("Kipy") Poyser. Banquet, masquerade.

The Bash, c/o BSTA, Box 1108, Boston MA 02103. 30 Oct.-1 Nov. Hal ("Mission of Gravity") Clement. Star Trek con as "Insterstellar Peace Conference." Come in character if you can.

NovaCon c/o Oldroyd, Garford House, 118 Domestic St., Holbeck, Leeds, LS11 9BG, UK. Birmingham England, Oct. 31-Nov. 1. Bob ("Slow Glass") Shaw. Regular British fall con.

LosCon, c/o LASFaS, 11513 Burbank Blvd., N. Hollywood CA 91601. Los Angeles CA, 6-8 Nov.

Intervention, Blue, Box 151366, Salt Lake City UT 84115. (801) 486-0601. 6-8 Nov., 1981.

ChiCon IV, Box A3120, Chicago IL 60690. 2-6 Sep., 1982. A. Bertram (Rim Worlds) Chandler, Kelly Freas, Lee Hoffman. The 1982 World Con. Go to other cons to prepare for WorldCons.

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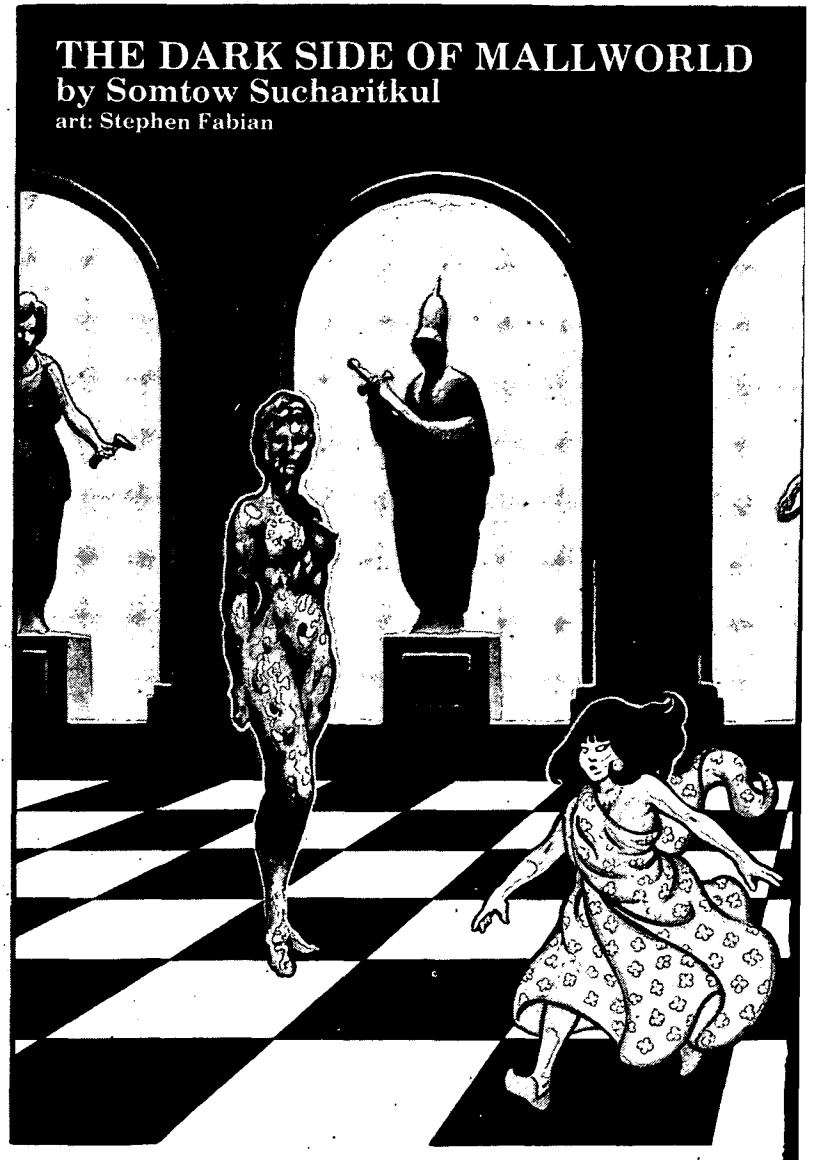
THE DARK SIDE OF MALLWORLD

by Somtow Sucharitkul

art: Stephen Fabian



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Mr. Sucharitkul's first novel, The Starship and the Haiku, *is just out from Pocket Books. Since it is about whales, he once threatened to call the book* The Humpback of Notre Dame, *but fortunately was restrained. Mr. Sucharitkul is, as this story shows, the only authentic purveyor of the Meaning of Life; he warns against buying from inferior imitators, even those that only charge a quarter.*

Mallworld, thirty-klick-long shoppers' citadel in space where every tacky dream comes true, was receding in the starless darkness as my car reached the first ring of transmat buoys. I didn't pay any attention, although the sight was remarkable enough. I was busy spraying my face with the memory-plastiflesh that transformed my appearance into the rheum-dripping, bug-eyed horror that symbolizes my profession.

I'm Dollie Salvador, and I work for Storkways Inc.'s main office in Mallworld. Oh, no; not as one of those diaper-clad, ever-smiling matrons who take your order for a classy, eugenically genegeneered bundle of joy. I'm the one who comes after you when you renege on your payments. A child repossession agent—a bogeyman.

The plastiflesh began to settle, hugging the nooks and crannies of my face. I blinked on the mirror-walls of the car and took a look at myself, shuddering, as the car popped through the ring and emerged somewhere on the other side of the belt. The blackness was utterly featureless. There have been no stars, of course, since the blue-skinned, magenta-haired Selespridar with their super-tech magic came down to the solar system to babysit the human race and ended up locking us into our own little pocket universe "for our own good." It makes space feel lonely.

I was very lonely in those days. Being a bogeyperson was—well, I joined the profession out of altruism. I grew up in a used kid lot myself, you know. Heard stories from the older kids. About parents. I knew that a parent who wouldn't do *anything* rather than not pay the mortgage on his kids was a perpetrator of the worst possible form of child abuse . . . but it was painful to be the tough one. Wearing this hideous uniform, I used even to forget I was a woman. It makes you sexless, this blotchy, warty, gangrenous travesty of a human face. It's supposed to scare your skin off. Usually it does.

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Everyone at Storkways shunned me. It seems that another evil of parents is that they tell you lying, libellous stories about bogeypersons, and frequently threaten to call them in to take you away. Their horror stories still cling to people when they grow up, and they often just can't cope with being confronted with, even working in the same company as, a bogeyperson. How lucky I was to be an orphan, I was thinking as my car darted into another transmat nexus.

Today's was a perplexing mission. I had to make a collection on twelve-year-old Hyacinth barJulian-Davies. It didn't seem possible. The barJulians are the richest family in the human race, and anyone who could claim a name like barJulian-Davies had to be at least wealthy enough to buy up Storkways. Hell, one of them owned Storkways. Hell, one of them owned *Mallworld*. And the kid was almost old enough to be an adult! It was fishy, very fishy. But they don't pay me to think.

I emerged in the region of space where the barJulian-Davies residence was supposed to be.

Vast stone faces, half-shadowed, peering out of the blackness, eyes that sent out lightbeams, criss-crossing the blackness—

The mansion of the barJulian-Davieses was an exact reproduction of an ancient castle in Bavaria, Earth—I recognized it from an old holovee docudrama—except that it rose dramatically from between the chin-clefts of a huge stone visage. It was Mount Rushmore—whether carved a second time out of some luckless azroid or dredged all the way up from old Earth, I couldn't tell. The four anonymous heads were a charming setting, both eye-catching and quaintly reeking of antiquity; laserlightswaths flooded from their eyes, the only illumination in the lonely darkness. I put the car on search—to find the parking lot—and subvocalized the secret code that gets a Collection Officer through any force-shield. . . .

And these were the people who couldn't pay an insignificant little payment on their child! I was suspicious, very suspicious. Surely people this affluent couldn't be so barbaric as to. . . . I drifted towards the mountains, readjusting my bug-eyes one more time for luck, observing as I got nearer that the mountains appeared to be plastimoulded over a chrome frame—bits of it peeped, like broken bone through a wound, out of the spray-textured rock. Just beneath the castle, a door in the neck irised open to receive me, and I caught, as I slid in, an artist's signature (I can't read, but I know writing when I see it) and a number. This whole architectural phantasmagoria wasn't even an original, then. It was a cookie-cutter-style, signed-numbered reproduction, one of dozens or even hundreds.

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What kitsch! I didn't like the barJulian-Davieses already.

The hall into which I dematted was vast, covered in imitation antique deep-pile shag carpeting, and brimming with peculiar art objects. I had materialized right in front of one, a swirling mass of chunky particles that encircled a pile of pirouetting lumpy brown rocks. Overhead, a chandelier-mobile put together from a phosphor-coated brontosaurus skeleton rotated slowly as it tinkled out an arrangement of one of the new *muzak concrete* hits. The place stank of megacredits, and yet was almost militantly tacky.

"Ah, hello." I turned to see a middle-aged woman in a potato sack, which her ample body filled to bursting. It was clearly a classic, expensive somatype—though I didn't recognize the Storkways ambience—which had gone to seed from overindulgence. "Well, well, well," she said, "you must be the new Giacometti reproduction we ordered from Earth! Come along, dear, and I'll show you your little niche. . . ."

This wasn't going right. I started to interrupt. Why wasn't I frightening her? She went blithely on: "Let's look at you . . . yes, *so* lifelike! An ancient sculpture, brought to life, as it were, in full color, moving and breathing, another miracle from Pygmalion Enterprises, the fine-art-repro-store that breathes life into the masterworks of antiquity! Ah, ah . . ." She sighed, and I tried to say something, but she went straight on. "Yes, it will be nice having you here, you know, none of the other art talks, of course, and our cousin Julian barJulian, you know, of the Mallworld barJulians, he's just bought an animated, talking reproduction of Picasso's *Demoiselles d'Avignon* for his suite at the Gaza Plaza, so of course we had to get something from Pygmalion Enterprises too, and—"

"Mrs. barJulian—"

"But my goodness, how lifelike! Let me show you the rest of the collection. This swirling brown thing, why, that's *Faex Vivenda,* one of the earliest twenty-fourth century coprokinetic sculptures—so *stunning,* isn't it? And so relevant to the human condition, too, this juxtaposition of the septic with the sublime . . . hanging from the ceiling"—I looked dutifully at the brontosaurus, desperately waiting for a hole in her chatter that I could dive into—"is *La Brontosaure Danglante,* by Michelle Ford—"

"Stunning," I said, "but I'm not—"

"I'm sure I'll hear all about you in good time, my dear. I'm so glad you're here, because the barJulians look down on us so much, and you'll add a bit of *class* to our little gallery, and then maybe the barJulians will stop making fun of us—"

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I couldn't help smiling a little. These people had *clearly* had riches thrust upon them somehow. Surely they weren't to the manor born, as the dirty earthies say, if they couldn't tell good art from junk. Even *I*, who am an utter philistine, knew why the barJulians must think them preposterous. "Mrs. barJulian-Davies, I've got to tell you that—"

But she was off again. We traipsed past an iridium-plated model of *La Bedlam sans Merci* ("The Ungrateful Asylum") by Praxiteles, which depicted a wild bunch of madmen seeking political refuge at the Feminist Embassy during the Ninth World War—the original, almost two millennia old, is very beautiful, but the iridium plating made this version look gaudy and pompous; we donned antigrav skateboards and circumnavigated a scale model of the Baths of Caracalla in the middle of which sprouted an organoplast rendition of the True Cross on which St. Vlad the Impaler was crucified; we skirted a wall of religious icons—a plaster-of-paris *Buddha and Child,* a laser-holo-crochet-by-number *Iphigenia in Schenectady,* and so on . . . I was being worn out. The strain of being treated like a sculpture—I guess I knew now how the boss felt, why machines always seem so irritable and defensive. We neared the end of the grand tour—I nearly tripped over the tabletop miniaturization of the Sistine Chapel ceiling—and Mrs. barJulian-Davies was going full steam: "So you see, my dear, whatever those dreadful cousins of ours say, we do have taste, don't we? And don't agree with me just because you've been programmed to humor me, now! Be honest!" She didn't wait for an answer, but began calling, "Herbert! Herbert! The Giacometti's here!"

"Oh, bother!" I turned around and had to restrain myself from laughing. Hyacinth's father had matted into the room. He was a maximalist.

You all remember the minimalist craze about ten years ago, when everybody was getting somatectomies and wandering around as severed heads on life-support platters? There was a reaction against that when the plebs got hold of the fashion, and did the pendulum ever swing! Mr. barJulian-Davies must have had dozens of pairs of limbs. He had had an extra eazi-stretch abdomen put in, and it had made him into a chimaerical half-human, half-caterpillar.

"My dear," he said to his wife, "that's not a sculpture, it's a person!"

"Oh, nonsense, darling. You've got no artistic sense whatsoever! No wonder the barJulians laugh at us . . . it's *exactly* what we ordered."

"Don't be silly. That's a plastiflesh mask she's wearing. I do be-

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lieve, dearest, that she—or perhaps he—is an interloper, perhaps *disguised* as a Giacometti sculpture, who may well be planning to abscond with our valuable works of art—"

That was it. I started to giggle.

"Rubbish! Even the sculpture's laughing now. If it was an interloper, how could it have gotten into the house? We've an unlisted code—"

"Well, why don't we ask it, you stupid woman?"

And they both turned expectantly to me.

I cleared my throat and activated my voice-rasper to maximize my frighteningness. "I'm Salvador of Storkways Incorporated, Child Repossession Division—"

"Oh, my God!" she said. "A bogeyman!"

"Why, relax, my dear. It's obviously a mistake . . . where is little Hyacinth? Perhaps we should summon her . . . why dear Officer Salvador, you can see by our—ah—surroundings that we are hardly the type who would commit a—a—financial impropriety! Allow me to shake your hand—" he extended three or four limbs in my direction, but they became all tangled up. "Pardon me, these new *fashionable* somatic metamorphoses that my wife *will* insist I undergo"—he shot her a blitzful glare—"take some getting used to . . . I'm all arms and legs . . . ha, ha, ha . . . now, what seems to be the trouble? Julian barJulian is our cousin, you know—"

I went on grimly with the official announcement. You can't perform a legal repossession without a formal announcement. It was a formula I had had to memorize, which I must have recited a thousand times during my work as bogeyman for various tiny baby farms, finally through a merger for the greatest baby farm in the solar system. "I must by corporate and overcorporate law inform you that, in repossessing your child, in whose mortgage agreement you stand grievously in default despite three official warnings, Storkways Incorporated does not act in violation of any of your child's human, cetacean, or sentient extraterrestrial rights. Only the right of parenthood, which has been legally defined as a purchasable commodity, is at issue here. Custody has now reverted to Storkways Inc., who may attempt to recoup their loss by offering the child's parentship for lease or sale at any period until the child's majority." I paused, expecting the usual terror-filled faces; I should have known better. There was nothing normal about this family whatsoever.

"That's absurd," said the father. He slithered around the Michelangelo coffee table and rested six of his legs on a chairfloat that dangled from a papier-mache reproduction of Alexei Shamborg's

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Man Fleeing from a Tower. I noticed that, towards his rear, a pair of purposeful arms was methodically knitting a sweater. "Absurd! Why, do you realize how much money we have? I mean, we're no Julian barJulian, but—"

"Stop mentioning that name!" His wife was shouting suddenly. "It's always Julian, Julian, Julian! Don't you realize we're going to lose our daughter? You bastard! You been deliberately not thumbing the house creditcomp and the payments haven't been getting through—"

"Don't be silly, dear. If there's been any sabotage, it's been *your* doing. You only wanted a child because the barJulians ordered one from Storkways and you had to keep up with them—"

"You—you vaculax! *I* wanted to keep up with the bloody barJulians, I suppose. They're your damn relations, you greasy, social-climbing—why, you practically invited yourself to Theresa's navel-embedding last year! And *I'm* the one you let them snicker at, your own wife—"

"Pope's pantyhose, I haven't the time to listen to a family row!" I yelled, hurling myself between them and prying a dozen hands off me. I felt a sudden rip, and . . . my rubbery plastiflesh skin was beginning to peel off my backside! "Now hand over the kid, huh?"

Mrs. barJulian-Davies backed off a little, knocking over a suit of imitation armor astride an ancient penny-farthing. "Look what you've made me do," she said. "Besides, you know damn well, Herbert, that you haven't been able to twiddle your thumbs over the paycomp since your metamorphosis; and you've been telling *Hyacinth* to manage all the household payments—"

"Are you accusing your own daughter of sabotage, you pretentious baggage?"

"What's going on, mother?" A sweet young voice from far away, in the middle of the room.

I whirled around. I couldn't see anything at first; the junk was thick as jungle. "Oh," the voice came, nearer. A childish, breathy voice: I recognized the Storkways *class* about it. "It's the bogeyman. Welcome, I've been expecting you. . . ."

The two parents stopped dead, aghast. I'd seen the artistic horrors of their art gallery and I expected the worst of their child. Some outlandish, garish custom-made somatype with three vestigial heads or little purple wings or. . . .

She stepped out from behind a corner of the Baths of Caracalla. She came right up to me.

"Can we go now?"

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She was a classic model—one of Storkways's best. Even working where I did, I had seldom seen a child so beautiful, so poised. I understood now why a family as wealthy as this one would have to get a mortgage for this girl. An artist had designed the soma. She had black, shoulder-length hair and a pale complexion specked with light, well-placed freckles; and she wore a gossamer sari, innocently revealing, that rustled in an artificial wind. Her eyes were all tans and beiges and yellows and grays and umbers melded together like little Saturns, and the iris-designs were perfect mirror-images of one another. And with this kind of beauty, the kid couldn't fail to have all the other standard features—the super-IQ, the whole bit.

I was furious now. I was remembering every horror story I'd ever heard about a parent. I hated the barJulian-Davieses. I had to snatch that kid away from them, fast, irrevocably. "You're pretentious, petty, little-minded people," I said. "This kid is the only real piece of art in this whole mansion, and you've been careless enough to lose her—"

"We'll get the credit to Storkways—as soon as my thumb is working properly," said Hyacinth's father.

"I don't take bribes," I said. "Work it through channels—and fast, because someone's going to want this kid. And maybe whoever it is will have more affection that you frigid phoneys have." I turned to leave, but the girl was already leading me away, her sari fluttering prettily behind her.

"Well! You sure showed them," she said, settling back into the seatfloat. She hadn't struggled at all. Mount Rushmore was retreating into the distance, and the transmat ring was centered dead ahead. She looked at me as if I were some kind of hero, not a bogeyman on a routine assignment. When she stared at me all wide-eyed I could see that her irises *were* mirror-Saturns: I could even make out the rings; they were capillaries, re-routed and tinted with glitter-pigments, truly a virtuoso bit of genegeneering. "So where to now? Are you going to pulp me or something?"

"Of course not." But I could tell she was scared. There *are* outfits who pulp 'em actually; fly-by-nights operating out of filthy earthie territory, where they still have governments and other corruptions. I shuddered to think of it.

"Well, where to?" she said. I could tell already that she was a very persistent person.

"The used kid lot," I said. "*You'll* get special treatment though, no doubt about it. You should see our used kid lot . . . you'll love

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it!" But suddenly I didn't really believe it. How could anything be like a palace after the affluence *she'd* known? I became insecure, defensive about how I'd grown up. I threw myself into toeing the party line, describing the carefree joys of living in a used kid lot, how they were really means of avoiding the overcorporate tax structure, how kids lived out their minority in considerable luxury there. . . .

"Well, no palace could be like the family house. When I grow up I'm going to buy it back and turn it into a Museum of Tack and Kitsch." I laughed. "You're not a bad sort," she said. "I'll remember you when I've sorted out the guardianship papers."

"What do you mean?"

"Idiot, don't you get it? I couldn't stand this hellhole any longer, so I sabotaged myself out! My stupid father hasn't got control of any of his new arms and legs yet, so he trusted *me* with the house paycomp!"

"Figures. I got a Croesus-rich juvenile delinquent in my car." She certainly had pluck. I tried to hide my admiration behind a mask of grumpiness.

"Can you blame me? Do you know I've never left that monster of a mansion in my life? That they only trotted me out at parties to annoy the barJulians, 'cause *I'm* the last creation of Master Genegeneer Lauren Klink; he did the DNA graphs just before he died and nixed them as soon as the zygote took? That I'm the *one* thing in that whole house that gives them any status whatsoever in the eyes of their exalted cousins? It was prison, prison, prison all the way! I went to school via a brainbox. I shopped in holocatalogs. I watched the feelies in my private viewroom. . . ."

"I'm sorry," I said. I couldn't really imagine her kind of life at all. I lived in a swingles condo-azroid. But even with the hothouse sex going on frenetically around me I had failed to find anything satisfactory. Well, when you're a bogeyperson you choose a lonely road. Nobody loves a defender of the law. They told me that a thousand times in training.

But at least I'd had a *chance* at a social life, even if I'd muffed it. She never had. I *hated* the barJulian-Davieses! "I hope your next parents are better. Even *I'd* make a better parent than . . . but why talk about the impossible?" I said quickly, avoiding the thought that had just flicked into my mind.

"Why's it impossible? I could easily give you the money and—"

I evaded the subject. For some reason, it made me much more nervous than it should have. "Besides, it's only for a year. I doubt

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anyone can afford to pick up your mortgage anyway, except maybe the barJulians, and—"

We crashed through the ring of buoys and sped through more blackness. "*I* can afford it," she said. "I've been saving up . . . don't you see, dummy? I'm going to buy my own mortgage and get custody of myself—"

"Hold it," I said. "That is most certainly against corporation law. You can't adopt yourself unless you're over thirteen—and *then* there's no point anyway, because you *automatically* adopt yourself."

"Well, you're not going to hold me to a stupid law like that, are you?"

"Yes."

She started crying.

I lost my cool. I got all unprofessional, I don't know why; whether it was all that hideous artwork or the unendearing personalities of the barJulian-Davieses, or whether I had somehow reached some karmic turning point in my life. I said, "There now, it's not so bad, Hyacinth—"

"Cindy," she sobbed. "I *hate* being called Hyacinth. . . ."

"Cindy, I'm not arresting you or something, you know. Your human rights are intact, damn it, it's my job to protect them! You wanted to leave your parents, didn't you?"

"I've been saving up since I was five. I want to get to Mallworld, sure, but this isn't how they said it would be—"

"They? Who's *they?*"

"Oh . . . I shouldn't say anything—"

"What are you talking about, Cindy?"

"My voices." The car swam through a cluster of rebuilt L-5-cylinders, strung together and trailing from a big azroid like *just married* tin cans in an ancient ritual. Cindy tugged at her sari and pulled out a neckchain with a pendant, a little Saturn that she held up gingerly by the rings—the tiny planet whirled around, without strings, without a thing holding it up. I knew it must be a Selespridon device. "It's an intervoke. A *Selespridon* intervoke." She handed it to me and I saw that it matched her eyes exactly. "Oh, you can't hear anything; it's mated to my brain-patterns alone. I subvoke into it and I hear voices in my head. . . ."

This tiny thing must be worth a fortune. It slipped into my palm, hovered above it, spinning, not quite touching it. "Klutharion—you know, the governor of the solar system—gave it to me at a reception at the house. He never came back, of course, even though they invited him many other times. Once was enough. Although natu-

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rally he was *captivated* with me."

"So am I," I said. Why had I said that? I could have swallowed my tongue. I was way out of line.

"*Everyone* is. Lauren Klink made me that way. Everyone except my parents. They're oblivious. So now that you're under my spell, how about dropping me off somewhere, out of sight, in Mallworld, and not bringing me in at all?"

"I can't do that."

"I'll pay you."

"The company would sue my ass. *And* they'd catch you in a second. There's sensors that record everyone who steps through a dematbooth in Mallworld."

"That's not what the voices told me."

"What voices? You're not one of those loonies, are you?"

"No, I told you I hear voices! In the intervoke, you know! Klutharion wanted me to be able to talk to the outside world, he had compassion for me . . . I hear voices from Mallworld! They call themselves the Mallkyries, and they're calling for me to join them . . . that's why I had this crazy idea of tricking the paycomp and manipulating this repossession . . . oh, don't you see, you've *got* to let me go! Otherwise it's just from one prison to another. . . ."

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"I told you. I can't. Besides, you don't really mean Mallkyries. *Valkyries* now—learned about 'em in school. They fought on the Norse side during the American Sybil War, a couple thousand years ago. You know, over Helen O'Loy. It's just a myth, anyway, and—"

"You don't understand!" she cried, and burst out sobbing again. "I've made a deal with them, they've got to help me now, all you have to do is get me to them. . . ."

"I'll do no such thing!"

"Wild and free," she sang softly. It sounded like some kind of slogan. *"We sweep through the ghosts of mallworlds past, we ride through the corridors of emptiness, shrill war-cries thrilling through the dusty air—"*

What was she on about? I saw how lost she was. We were alike, more alike than I wanted to know about.

"You don't like me." More crying.

"There now. There now." The head office could deal with it. Clearly I was way out of my depth. She was bright all right—her stratagem for running away from home proved it amply—but being alone with those neurotic parents for so long must have unhinged her mind. Her veneer of easy, smartass banter hid the hurt well. My heart went out to her, even though I knew I was in way over my depth. She couldn't really be in contact with a mythical creatures in a shopping mall. She needed . . . she needed. . . .

"You want to have sex?" she said suddenly, in a childish parody of a seductive voice.

"One," I said, "I don't like girls; two, we don't take bribes; three—stop crying, damn you, child!" Then I took her in my arms and held her for a while, as the car raced on through the featureless blackness. Night would be so beautiful if only we had stars.

"Why don't *you* adopt me, anyways? I bet you could use a kid. I've heard about you bogeypersons. You're a sad, lonely lot. I could cheer you up pretty good. . . ."

Crafty, I thought. *That's the first time I've ever heard* that *ploy, in all these years of ferreting out kids* . . . and then, for a moment, I thought of having her as a daughter, I tried on the idea for size, but only for a moment! I shrank away from the thought at once. *No! Be professional!* I froze, concentrated on subvoking needless commands to the car's pilotcomp. "No."

"Pretty please—"

"No!"

"I'll never get away!" she kept saying, over and over. And sometimes she would hold her intervoke in her hand and seem to be

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listening to something, and she would nod her head and seem to be subvoking a response.

And I was feeling . . . involvement! Oh, of course I'd felt sorry for them before, I mean, you wouldn't be human if you didn't, but this was different. It wasn't a clinical, *professional* kind of sorry.

For a split second I was tempted to let her go. To drop her off and run away and bury myself in my floatbed in my condo-azroid and never come out again. . . . But I couldn't do it. My years of training were in the way. I could only hold the kid and feel sorry for her.

So, to pass the time between transmat leaps, we talked.

I told her about growing up in a used kid lot.

"Did you like it?"

"I loved it," I said, sullenly. It occured to me that I might be lying to myself. I waxed loquacious, revealing things about myself that even *I* hadn't known before. I fantasized about Cindy being my daughter again; for a few moments, that fragile absurdity seemed almost real.

And the girl listened. That flattered me.

And then we were silent for a long time. Afterwards we breached the last ring of buoys and were in Mallworld space. Mallworld gleamed mirror-silver out of the darkness. Thousands of cars poured in and out in light-shafts that were traffic-lanes, each car a dust-mote quantum in the beam . . . we merged into a lane and Mallworld grew until it filled the sky, its beacons flashing, its holo-ads dancing over the surface, its pennants waving, its bouncy muzak dunning over every channel of the car's intervoke. I called the office and shouted over the roar—

"Boss, I have the barJulian-Davies kid here. . . ."

"Good!" came the hated mechanical voice. "We'll only be holding her for a while; her parents have already paycomped the penalty and back payments in over the realtime transmat. They're on their way to get her."

"No!" screamed Hycanith. "You can't make me, I'm not going, I won't let you, you've got to help me escape—"

No time for regrets now. I was a bogeyman and Hyacinth was my case for the day and now it was time to come down to earth. "There's nothing I can do," I said with as much coldness as I could muster. "Will you come peacefully, or what?"

"No!" she raked her fingers across my face, scarring the plastiflesh and ripping it so hard that it yanked away hair. I yelped in pain, grabbed her arms and subvoked the child-restrainer. Spider-arms came twisting out of the seat and held her fast. "Now for Pope's

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sake," I said, "don't make it any more difficult for me. This is hard for me too, damn it . . . forget I said that, OK? Now do I have to zonk you out on sleepitoff gas?" I think she could see how unwilling I was. Hell, why couldn't I hide my feelings? She nodded. As the car docked, I quickly stripped off the rest of the uniform—leaving my skin raw in places—and sprayed on a regular worksmock. "Why do you have to wear that thing anyway?" she said, all charm. "You're really *pretty* underneath it."

For some reason I was touched. I've said it before, in this job I'm always forgetting I'm a woman, even an attractive one. Take it back. Actually I don't forget, but everyone else does, and it's easier on me if I pretend to forget too. . . . I smiled.

"You're smiling," she said. "My parents never smiled. . . . You care a lot more than my parents ever did," she said in a very small voice. I didn't answer. We didn't speak until we had floated down the nothing tubes and stood at the B63 entrance of Mallworld. I had her under restraint—snakelike metal tendrils held her to my wrist—and she wouldn't budge. She was staring at Mallworld.

Up and down as far as you could see the levels went, with rainbow-walkways soaring and crazi-gravi corridors twisting and plastic air-tubes rocketing people back and forth like flies in a drinking straw and slidewalks racing each other and wedges of shoppers converging into demat-booths and popping out of them. . . .

"Must be some overload," I shouted over the din. Some young kids were playing at hang-gliding from overhanging slidewalks, letting go at the last minute; shopping bags marched purposefully about; and in a few seconds I had rejected offers of insurance, sex, and stretch-o-credit from loudmouthed vendingbots. Half-zonked-out on Levitol, a six-armed man hovered in the air just ahead of us and juggled shrunken heads, croaking "Two for a credit! Little heads from NeoBrazil reside in your mouth and don't eat much and do all your talking for you—guaranteed knowledgeable on seventeen selectable subjects—"

"Damn it, you can at least unlatch me," said Cindy. "I'm not a criminal, you know." I thought about it for a while, and then decided that I could trust her. I subvoked a command; the restraints dissolved; we hopped onto a slidewalk. I made sure she didn't wander more than a couple meters away from me. I didn't tell her I had a stunner, either.

We whipped past Ali Baba's Flying Carpet Mart, where old men with hookahs were hovering around on pre-faded, pre-frayed shags and linoleum rugs. Above our heads, a pro laseball team streaked

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by on an upper level slidewalk in glittering wings and sequined uniforms, followed by a xylophone and port-a-piano pick-up band and a dozen leg-kicking pom-pom girls wearing wooden barrels and ostrich feathers.

"Impressed?" I said. "This is going to be your home, you know."

"Uh huh," she said. She was fingering her Saturn-intervoke again, and she seemed far away.

Fantasizing again. Dreaming about her "Mallkyries" . . . whoever they were.

"Slow down—" I hopped onto a new slidewalk, following her. I knew there was no way she could escape, but I was edgy. I was too involved; I might make a slip.

She bolted.

"Don't be stupid!" I shouted. She sprang two slidewalks in one leap. I hurdled a shopping bag and missed her slidewalk, jumped again, kicking a salesbot and sending it sprawling in a shower of plastic fruit. She was outdistancing me. I knew I should call for help but I was burning with embarrassment. Why had I ever trusted her?

I clutched at a fold in her sari and she went diving into a demat-booth with me in tow.

"I'm coming, Mallkyries!" she was screaming at the top her voice. *"Wild and free—"*

A fakir started from his Bed-o-Nails—"the holographic fluff-bed that makes you look like an ascetic"—punctured his hologram and fell groaning into the bedframe. I trampled the painless nails and sprinted onto the slidewalk, caught up again, went through another booth—

An emptier corridor now, just the imitation amethyst brick walls of Gimbel and Gamble's Department Store with its chorus line of trunk-wiggling Christmas trees touting bargains to the one side and the metal-curve walls of Aunt Abedah's Monopole Skating Rink on the other. I had just come within a centimeter of her again when—

Vroooom!

A rush of wind blew me over, kicking helpless against the slide-walk. I pulled out my stunner but a big black *thing* knocked it out of my hand. I looked up—

Soaring motorcycles were pouring out from the nearest demat-booth! Clouds of noxious gas billowed! "Cindy!" I bellowed above the roar—

Holy vaculax! I thought. *She's tricked me!* Anger blinded me. I wanted to punch her in the face. To think that I'd told *her* the story of my life! To think that I'd considered—daydreamed about—adopting

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her, the scheming, sneaking little bitch! I—

Gloved hands reached down to grasp her. I saw her astride a motorcycle now: they weren't real reconstructed vehicles, they had bulging bug-eyes where their headlamps should have been, and they flew in figure-eights around my head, and the women who rode them wore horned helmets and screeched forth primal-sounding ululations; and then I oozed my arm out to where the stunner was and lost my cool completely and let loose, firing randomly into the black pungent fumes—

I hit one of the motorcycles. It began to yelp. *Pope's boobs, it's alive!* I remember thinking, as a black shuddering mass of flesh plummeted towards me and knocked me out.

When I came to in my office, with the voice of the boss ringing frantically in my ears and a moaning motorcycle tossing and turning on the hover-stretcher beside me, I found out about the dark side of Mallworld.

And about many other things. For instance, that there was a tiny clause in my job contract (which I had not, of course, read) that rendered me totally and utterly liable for the missing kid, to the tune of life in a "credit rehabilitation clinic"—all right, debtor's prison.

"Shut up, you damn machine," I said wearily. "How could I have possibly known that those Mallkyries existed? Who are they, anyway?"

"Listen, Salvador," it said, its voice reverberating from every curve of my uterus-shaped office. I waited. "You've really thrown the cat into the fishtank. Heavens, woman, you've even put *my* job on the line! I want her back!"

"How?"

"How? How should I know?"

"Who *are* these Mallkyries, anyway? What do they do?"

"They're from Darkside, probably."

"Darkside?"

"My God, woman, didn't they teach you anything in basic training?"

"I didn't go through the Storkways training. I came with a merger."

"All right, all right . . . look here. Mallworld has 57,000 cubiklicks of space. Half of it's fallow. Understand? Level upon level of empty gray metal, waiting to be leased out. Levels of ghost malls, abandoned levels . . . the skins between the levels, too, that no one

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visits now . . . they say all these places are inhabited. Julian barJulian XIII found one tribe of wild children, roaming the hidden stairways and stealing to survive. But there's more than one. There's dozens. *Hundreds,* maybe, somewhere. You say the barJulian-Davies girl was communicating with one of these gangs?"

"I thought she was imagining things!"

"Idiot! Never make such presumptions about a class–A+–IQ Storkways product! Her mind would never have malfunctioned before the guarantee ran out. . . ."

"So why can't we run a demat-booth trace on her? Surely she's left enough cells scraped on a booth for us to run a DNA check through the standard surveillance comps. This can't be that big a deal," I said nervously. It didn't answer me for a while . . . I watched the motorbike as it stirred in its sleep. It seemed to be having a nightmare.

"You don't understand!" Its voice was buzzing in frustration. "If she's gone over to Darkside, we *can't* trace her. We can tell what booths on our side she went into, but we can't tell what booths on Darkside she came out of. The detectors have stopped working in Darkside, or maybe they never worked . . . we don't even have accurate maps; we don't even know the right letter-number codes; you'll have to try them at random, probably. Wait a minute—I don't think we *will* be able to check out DNA traces anyway. Wasn't she a secret model? We don't even have a copy of the gene-patterns in our files!"

"But sometime in her life, someone *must* have taken a tissue sample or something—"

"So that's why they never let her out of the house!" said the boss grimly.

"They didn't want her tissue scraped, they didn't want even the chance of a clone. . . ." What selfish, self-serving bastards those barJulian-Davieses had been!

"Well, you'll simply have to find some other way."

"*I'll* have to—"

"Well, damn it, you're responsible!"

"It'll take the rest of my life."

"Would you rather spend it in a credit clinic?"

I gulped.

"Then get on with it," it said.

"But I don't even know how to start!" I said. A comsim image of the boss was flying around the wombroom, haughtily sniffing the motorcycle, which was puffing fume-cloudlets and whimpering.

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It said, "They say that only three people know anything about Darkside. They're old women who were around two centuries ago, when Mallworld first started. The Selespridar keep them alive, sort of as living fossils, and keep replenishing their RNA so they'll remember *everything* and amuse them with stories about the old days. Sort of repositories of ancient lore. The Selespridar are very into humans as a bunch of—you know—naive primitives, but somehow closer to the 'meaning of life' or something than they are . . . well, you know they're always looking for this untranslatable *ug'unnieth,* this transcendental epiphany of the alien condition . . . these ancient women might know something about these 'mallkyries'."

Why am I even bothering? I thought. *There's no hope, and besides, she's exactly where she wants to be. But is she, though?* I remembered that—sophisticated as she was—she'd never had any direct experience with the outside world. Maybe she had been lured by these people. Maybe they were going to hold her for ransom or even torture her or something.

And then I brushed aside these unprofessional, over-sympathetic thoughts.

No one gets the better of Dollie Salvador, I thought. *No one! I'm going to get her back just so I can punch her in the face.* Getting angry was just the right thing to do, because if I was worked up enough I wouldn't worry about losing my job or about how nearly I'd come to being thoroughly seduced by the girl's charm index into committing a crime against the bogeypersons' ethical code. I didn't want to think about any of that. My rage burned, and it felt *good.*

"So what do I do? How do I find these three old hags I'm supposed to consult?"

"They work for Stochastix Unlimited as fortune tellers. Just ask for the Weird Sisters."

I was nervous as hell as I dematted—wearing my full uniform—into the roulette-cum-ferris wheel structure that was Stochastix Unlimited. I don't believe in fortunetelling myself, but the paraphernalia is disturbing. The ancient earthies with their jet planes and oxcarts used all sorts of methods to divine the future: examining entrails, looking at the stars—we can't even do that anymore, we can't even see the stars to make up lies about them—consulting their witch-doctors and their weathermen. But the old things haven't lost their scariness, or their primal power.

I was in a little room. In front of a bank of sensors, three wizened heads rested on a life-support desk. There was an old-style, unyielding chair which would not adjust to my body. I looked at the three

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heads in turn.

"Uh, are you the weird sisters?"

One of them—they were all eyeless, hairless and toothless—suddenly snapped to. "A visitor!" she croaked. "You want a stock market report? Or do you want the general reading with optional love-life analysis for an extra three credits?" Then she blinked out. The next head came to life. "I see by your bearing, sir, that you are a nobleman . . . let me see, your cards indicate—"

"I'm a woman," I said. I was used to people not knowing my sex, but one day my poor camel's back was going to crack.

The third head broke in: "—that you have reached a karmic nexus in your chain of being. Beware of the dog. You are crossed by the Ace of Spuds, reversed. Potatoes will give you dropsy. In the immediate past, you have Ineptness and The Meaning of Life reversed. . . ."

"I didn't come here for a tarot card reading," I said angrily. I noticed that they only spoke one at a time, in turns, and when it wasn't one of their turns they would seem oblivious to me; they would either freeze as if dead, or gibber quietly to themselves. Sure enough, I saw that the sensor bank was only connecting with one head at a time, and there was a comsim waldo triggering a simple switching device. "Where are the Mallkyries?" I said. "I'm with Storkways repossession, official business; you'll be rewarded. . . ."

They all screeched raucously. "Five credits for your fortune," cackled the one who was **on,** "double or nothing option if we're more than fifty percent wrong as determined by an impartial compalyzer. Ten credits for extra service."

"But maps of Mallworld—hee hee hee—priceless!" The third head glared at me and stuck out its tongue.

"Damn you!" I marched over to the other side of the table and yanked the cord off the sensor waldo. The three heads began screaming.

"We can't see!" they shouted all at once. "Turn us back on—"

"Only if you answer my questions."

I got the level number.

Loonies, I thought, every last one of them. And these were the women to whom the Selespridar had given the gift of immense longevity . . . who entertained the gods themselves with their anecdotes! How preposterous. I hopped out of the building and turned on my wrist tracer so that the heavies could come after me if anything developed out of this. Somehow I didn't think it would. A child with a pet gaboochi in tow ran screaming when he saw me. For the first

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time in my life, I wasn't really enjoying my role as bogeyperson. . . .

No. I'd never enjoyed the role, damn it! But I was admitting it to myself for once.

I was a washout as a bogeyman anyway. I'd succumbed to carelessness. I should've known better than to fraternize with a repossessee. Now I was on what could be my last mission. I could vindicate myself with the bogeypersons' guild, or I could get credit clink and blackballed for life.

Frankly I didn't give a Pope's feminine napkin either way.

I entered a demat booth. . . .

I was going to step out onto uncharted Mallworld now. Maybe the booth wouldn't even work, and I'd get accidentally decapitated or worse. I closed my eyes and called out the strange number: QQQ222.

When I opened my eyes I was in a ghost mall.

Gone were the strident holo-hypesongs; instead, there was distant echoey whispering of ads that were running down . . . mournful deep voices that sang of forgotten brands of deodorant soap . . . a lone light flickering in a restaurant where man-sized steaks still waltzed in agonizing slow time in the window . . . still slidewalks. Musty, dusty air. So this was Darkside.

What to do now? I had no leads, other than the word **Mallkyrie;** my only weapon was the standard issue stunner; and I looked ridiculous in the bogeyman's garb, with nobody around to shriek in terror. I stepped on to the nearest slidewalk. With a thunk it came to life. How many decades had it waited to be awakened by the pressure of a human foot? The slidewalk bore me forward jerkily. What was I to do? "Cindy, Cindy—" I called out, feeling like an imbecile. A deactivated salebot rocked back and forth on a chair. A mechanical plant-band, left to photosynthesize in the half-dark, twittered and twanged and disgorged an occasional cacophony of music and white noise into the stillness. Sudden local breakdowns of the pseudogravs made me queasy and the dust dance. "Cindy! Cindy!" I was so angry I think I would have stunned her on sight.

"Cindy, come out of there, you crazy girl!"

A light-fleck in a demat-booth. A wisp of sheer sari . . . I sprang off the slidewalk. "Cin——"

They were crashing out of the booth. I couldn't see in the darkness, the air was thick with fumes. A motorcycle raked against my face and sheared off plastiflesh. I was bleeding. I grabbed my stungun but a fist came pounding down on my face. Pain shot through me. I saw stars, and then, through the stars—

I saw *her* standing by a decaying sushi bar. Light from a phos-

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phorescent plastic tuna in the window played over her soft, innocent features . . . I was so relieved I almost forgot what a nuisance she'd been. "Get me out of this!" I yelled.

She looked away. "Damn you! Rescue me or something, it's me, your friendly bogeyman, remember me?" She turned her back. Had I seen a flash of guilt in her eyes? Then she leapt onto a slidewalk and vanished into distant darkness. I was pinioned, strapped to the bottom of one of the motorbike things, choking and spluttering, the whole corridor was purring now, the convoy levitated and thrust into the darkness. . . .

My eyelids were getting heavy. The fumes were addling my senses. We were going down a long dark tunnel, like a terror tunnel in a funpark, now and then a sign touted wares across the thunder of motorcycles . . . PRIME AZROID REAL ESTATE, GUARANTEED NO NEIGHBORS WITHIN SEVEN THOUSAND KILOMETERS . . . **CLONESTEAK! DOUBLES WHILE YOU GOBBLE!** . . . BE A HAPPY MISANTHROPE WITH HOLO-PROJECTION! **Fool your friends!** . . . after I don't know how long, I passed out.

I'm alone. The stars are shining, so I know it's a dream. The stars appear in all people's dreams, though no living human has seen them.

Cindy's running towards me. We're hugging each other. I'm warm all over, just like in the Storkways holohypesongs. This is ridiculous, *I'm thinking to myself,* me, the self-sufficient one, throwing away my career, my hard-won stake in real estate, the condo-azroid. . . .

She's laughing, her Saturn-eyes are laughing too . . . I want it to last forever, *I'm thinking. And then—*

Her smile becomes a feral shriek, a cry of bloodlust, like a wild earthie in a feelie. She hops onto her motorbike and zooms away. I'm lost now, I'm a little girl again, and now I turn around and see the bogeyman waiting, gibbering, arms outstretched, his claws are dripping rheum and eyes are ember-red and I'm screaming, screaming, the way I never did when I was a kid, he's saying, You thought you weren't afraid, didn't you, you thought I wasn't real, but I *am* real, I'm inside you, I'm eating my way out and soon the outside and the inside will all be one, one bogeyman, *and I scream and I scream and I scream—*

I groped around. My feet were shackled. After a while I got used to the darkness. I was in a dank room. A sharp smell of Levitol lanced the air. This must have been a storeroom in a drug emporium once. I was starting to feel fluttery on my feet just from the scent;

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then I noticed the casks of it, leaning by one wall. A fractured ceiling-grille let in scatters of colored light. I strained to see more.

On the floor were stacks of plastiglass motorcycle-shapes . . . molds it seemed. Some of them were part-full of some furry, fleshy substance, dark and sometimes bulging with darting bug-eyes. Beside them I noticed racks of gaboochi eggs. So that's what they were, I realized. You can break the Fomalhautan gaboochi egg into almost any kind of mold and it'll grow into the shape you want. That's why they're such popular pets—you can custom-mold them into dogs and cats and all sorts of almost-extinct creatures. One of the helmeted Mallkyries could probably control the gaboochi through its ears—modified into handlebars—and I guessed that they must fly by being pumped to brimming with Levitol. It was cruelty to animals of the first order. I got angrier, pulling at my restraints and cursing colorfully into the emptiness.

I thought of the bogeyman inside me, eating his way out—

That girl! What she's gotten me into! I wanted to turn her lovely hide black and blue even though one square centimeter of it was probably worth as much as my whole condo-azroid. *If I ever get out of this alive—*

And then she matted into the room. She came to me. She had a laseknife stuck in her sari. My stomach jumped. "What's going on now?" I said. "You're not going to kill me, are you?"

"Well . . . actually . . . yes," she said, sounding apologetic. "It's not my fault! It's the initiation rite. Every Initiate has to *collect* someone before they can become a full-fledged Mallkyrie." She started to pull out the knife.

"Be careful with that thing—"

"Oh, bother," she said, fooling with the adjustments. I had to talk quickly or I'd find myself placed among the stars.

"Look," I said, "you don't want to do this, do you? I mean, did they tell you all along when you were listening on the intervoke that you were going to have to kill people?"

"Well, not exactly . . . they sang of freedom, of whooping down deserted mallways, of singing wild songs, of merry comradeship, of the wisdom of Odin—"

"Who's that?"

"The Leader, of course. He holds court in Mallhalla." This was becoming incredible. I couldn't believe that I was going to die for this . . . hideous distortion of a myth. My dream had lied to me. *They* were destroying me—it wasn't my doing!

"Hold it!" I said. "Listen, I'm your friend, remember? I talked back

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to your parents, I told them off for you—"

"You wouldn't let me go," she pointed out. "You wouldn't even adopt me after I offered to pay for it!"

"How could I? I had a job to do—"

"So do I."

"Yes, but. . . . We were getting along so nicely! I trusted you, I didn't tie you up, you remember? How the hell can you just waste me like that? I bet I'm the first friend you ever had in your whole life—" I was gabbling now, confused and terrified. "Look, you really like it here? You really enjoy doing this?"

"I hate it! I hate it!" she cried, all at once emotional. "I never expected it to be like this—" She threw the knife down. "It seemed so *exciting* and it turns out they're just a gang of cutthroats! What's more, there's some kind of stupid tribal war on, against the Amazons or something, and it's deadly serious and they're offing people left right and center—"

"Unshackle me, Cindy. I'll get us out of this somehow. I don't know how, but—" (*The wrist tracer!* I was thinking rapidly. *If I can only hold out long enough for them to miss me and do a scan and send reinforcements. . . .*)

"How can you get us out?" She was weeping now. "I'm tired of this game, I'm trapped, they're going to kill you and then I'll be stuck in Darkside for ever and they'll train me to shoplift and ride mutant gaboochis and—"

"Fun," I said. "Until—". She picked up the laseknife and cut me free. "Now what? Can you get us a couple of those—" I indicated the motorbike molds. "*—things?*"

"I doubt it. Those aren't due for another six months and they're mind-mated as soon as they're released, *that* one's—" She pointed to a motorcycle mold that was full almost to bursting with the brown fleshy stuff. "—going to be mine."

"We'll have to use our wits, then," I said dubiously, rubbing my sore wrists. "Where's my stungun?"

"Don't know. Look, why don't you just let me kill you, and if they come for me I'll say they *forced* me to—"

"Forget it."

"Yeah, I guess."

"Ever taken Levitol?"

"Some, at parties, only socially though."

"Where's the nearest working pan-Mallworld demat-booth?"

"Two hundred meters, maybe a quarterklick from here. There's guards, though."

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"It's dark, right? If we use those faulty slidewalks they'll go chug-chug and waken the troops, right? So we'd better ohdee on Levitol and sail right over their heads."

"Sounds dangerous."

"You want out or don't you?" Maybe I was being too hard on the poor kid, I was thinking—irrational, since she'd just tried to snip me—how confused my feelings were getting!

We tiptoed to the nearest Levitol cask and I broke the seal. Pure Levitol—not the kind in tablets at the drugstore—came fuming out. The gaboochis in their glass prisons twitched, straining to break loose. I put my mouth to the hole and took a gulp. The next minute I'd practically conked myself out on the ceiling. In a moment Hyacinth had joined me. "Okay," I said, "let's hit out."

"I love you," she said.

"Don't give me any of that," I said. "I know you. You'll say anything to get by. Just because your IQ cost twice as much as mine did—don't cry, for God's sake!"

"There's two of them at the local demat-booth," she whispered.

"I'll take the one on the left." We both maneuvered into the booth, popped out, fists raised, swooped down, clobbered, left two neatly knocked-out Mallkyries in a little heap. Their motorcycle-gaboochis were tethered to a pole by the slidewalk. We held hands, giddy, skimming the vaulted ceiling of the corridor. The one working demat-booth that could get us out of there was blinking in the distance. CREDIT BAD? a sign sang softly. BETTER DEAD THAN IN THE RED! LOW-COST SUICIDE PLANS! LAYAWAY AVAILABLE . . . headless skeletons in the window were juggling skulls that hummed barbershop harmonies. I shuddered, floated onwards—

A shrill caterwauling rent the air! I tried to brake myself, but couldn't because of the momentum of the Levitol. "The motorbikes! They're mindlinked with their owners! They must've sensed trouble!" Cindy said. Sure enough, a pack of Mallkyries had matted in from nowhere and were zeroing in on us, yelling their war-cries, expelling thunderclouds of gas fumes. "We're doomed!" she screamed. She clutched me hard. We clung to each other, still flushed with Levitol and still whooshing inertially towards the demat-booth.

"I can't stop—" Adrenalin and Levitol don't mix well, and we were figure-eighting and doing involuntary aerobatics as the Mallkyries closed in.

Then—

Ahead of us, another dust-cloud. Perched on flying unicorns, women in flowing robes with one breast bare, brandishing laser-

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lances, were bursting through the paneless windows of a half-eaten gingerbread cathedral!

"Holy Vaculax!" screamed Hyacinth. "It's an Amazon attack!"

"We'll be caught in cross-fire!" I said, holding her tight as we veered towards a wall and ricocheted like a flatulent balloon. The Amazons were whooping now, their unicorns—more altered gaboochis—were bucking and rearing as they hurtled towards us. The lances flashed! The motorcycles baroomed as we managed to duck and they crashed headlong into the wall of unicorns—

"We're done for!" said Cindy, as the Levitol wore off more sharply and we began to plummet towards the chasm between two slidewalks.

"Hold on to the slidewalk!" I shouted. I put my arms out and caught the edges of two slidewalks and I dangled stupidly for a moment, and then I realized with horror that the pressure of my arms was making the slidewalks lurch to life and they were different speeds and if I didn't let go I'd be torn apart and—

"Hyacinth! Hyacinth!" all-too-familiar voices were squealing over the war-cries. I managed to push myself up onto the slower slidewalk and to haul Cindy up. Above us, the carnage continued madly. Running towards us on the opposite slidewalk were the barJulian-Davieses!

"You come back with our daughter, you . . . you monster, you!" the mother was screeching. She leapt with astonishing agility onto where I was standing and began pummeling me with her fists. The Mallkyries and Amazons had left their steeds in mid-air and were now jumping down onto the slidewalks for hand-to-hand combat. From the corner of my eye I could see a clanking army of servo-clunkers with sleepitoff wands charging into the mob and dealing indiscriminate instant sleep, and I could see bogeymen here and there directing them. At last! We were being rescued! They'd finally traced my tracer!

I grabbed Cindy's hand, gave Mrs. barJulian-Davies a sharp kick in the shin in an explosive seizure of hatred, and started towards the nearest bogeyman.

Without warning there was blinding light everywhere. Thunderclouds materialized in the passageway, and bolts of lightning shot out of holes in department store walls. I couldn't see a thing. There were shouts of "Zeus!" and "Odin!" and the gangs seemed to be scattering.

And then there was this cavernous, menaceful, mocking laughter coming from everywhere. Resounding through the corridors. I felt

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lightheaded suddenly, as though I'd taken another dose of the Levitol; I felt as though I were dissolving almost, becoming ethereal . . . and I was. The laughter echoed round and round my head. "I'm going bananas at last!" I said to myself. "Finally this job has gotten to me!"

And now we were in a vast hall. The floor seemed to be of cloud. Fog drifted around our ankles. There was just me and Cindy, and Mr. and Mrs. barJulian-Davies, who had withdrawn to a distant corner under a pillar and were consoling each other. Hyacinth's father had draped his caterpilloid abdomen around the pillar and was *still* knitting a sweater with his eighteenth or so pair of appendages, and was still utterly awkward with all the other arms and legs. This must be one of the old fantasizing palaces that were so fashionable some decades before, somehow still in working order. I'd sometimes gone to one when I was a kid and pretended to be an olden princess, ordering her slaves around and guzzling gas from jewelled goblets. The hall was walled in naugatimber, elegant and old-fashioned. Drinking-horns hung from the fakewood columns; it was they that exuded the perfumed cloud-stuff that swirled all around us. . . .

The laughter went on and on. And finally we saw its source, materializing on a dais at one end of the room. It was some kind of godlike figure: tall, hairy, in a tunic sort of costume with a horned helmet like the Mallkyries'.

"Who the hell are you?" I said.

He went on laughing. Finally he spluttered, "Who do you think? I'm God, of course! Odin! Zeus! Whatever. . . ."

Let us go," Mr. barJulian-Davies demanded. "I'm sure we can come to some financial arrangement, and besides, my cousin Julian barJulian, you know, of the Mallworld barJulians, won't like it at all when he finds out you're holding us prisoner here . . . when all we wanted was to come and pay for our daughter in person, the house paycomp was acting up, you know, and it kept telling us we didn't have any money—"

God went on laughing.

"Will you tell us what's going on?" I said, marching right up to him. "You're obviously mad, you should be put away. You've been recruiting people, gulling them, filling their heads with romantic dreams and then making them fight your costume-party wars. What kind of a messed-up ego do you have, to be able to—"

"You're right." His voice boomed, filling the whole hall easily. "I *am* mad, of course—ha, ha, ha!" He tore at his face. The plastiflesh

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fell to the ground. A musky, sensual odor emanated from him. His face was blue. Magenta hair fell from the crown of his head in waves and rippled softly behind him.

"You're—a Selespridon!" said Cindy.

"And a mad one, no less," said the alien, stepping down from the dais and proffering his hand to us. Cindy's parents had by now retreated into a quiet, gibbering hysteria. "My name is Kmengdreft the Crazy. I've been exiled from my home world, you know, doomed to wander forever among you primitive species. . . ."

"What excuse does it give you to hide in a shopping mall and play god?"

"Academic curiosity . . . I'm fascinated by your legends, your myths. I'm quite a xeno-anthropologist these days, you know. Hee hee! Of course, most of the evidence of your Dawn Times has been destroyed, but one does one's best . . . did you like my motorcycles? Some experts think the Valkyries weren't in the same period as motorcycles, but . . . one must be creative, mustn't one, when it comes to times so remote? And sending out random intervoke-temptations to people, luring them into this closed, controlled world so they could live out their primaeval past with utter abandon, with a God to turn to when they feared responsibility . . . what an *exciting* experiment. *Exciting*. Maybe my peers will even summon me home, away from this merde-eating hole, and acknowledge my brilliant achievements, eh?" He paused.

"You bastard!" I said. Everyone knows that the Selespridar are a great and wise race, and that they love us humans like fathers and are full of compassion . . . of the three or four last straws of the day, this one was as shattering as it was unexpected. I couldn't believe it. "You're a Selespridon!" I said, bitter because I would soon have to give up Cindy and go back to letting the bogeyman eat me away, bitter because the Selespridar had stolen the dreams of all humans. . . . "You have everything! Why can't you teach us great things, instead of going native and messing with our lives? You live a million years or something, and we only last a century, but you want to snuff even *that!* There's so much you could help us with, and yet—"

"Oh, I tried it, I tried it. Became a Zen master for a while. No fun. I'm just a lousy Selespridon after all. Nobody loves me." He began to laugh again. "I don't *have* to let you go, you know," he said.

That should have scared me; the Selespridar have unthinkable powers, and they're *aliens,* you can't really understand them even when they're acting almost human. But instead of terror I felt

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numbed. All I wanted was to hand Cindy over and go home and hide. But Cindy saved us.

She spoke up. "It's nice to know," she said ever so sweetly, "that even though you Selespridar are masters of the Galaxy and all that, you can still go bonkers too . . . makes us feel, you know, *closer.* More like a kindred race. We go crazy all the time, you know. I'm crazy. My parents are incredibly crazy. And bogeyman Salvador . . . she's crazy as hell. She bluffed me into not bumping her off, and she's been saving my life all day, even though she knows I've been manipulating the baloney out of her all day." I started laughing, helplessly. There wasn't anything left to do. So did she. And he. We were all cackling and guffawing until we cried. Except the parents, who seemed totally out of it.

"You know," said the Selespridon, "that's the nicest thing a human ever said to me. Maybe I will attain *ug'unnieth* after all." He became grave then, and said, "I guess I'll let you go and give up this whole thing . . . one of the reasons I'm insane is that I only have an attention span of about ten of your years . . . and I'll just turn myself in to the Selespridon authorities. Just as I was having fun, too!"

"But . . . what'll happen to you?" said Cindy. The poor kid, she was concerned about him! She'd followed her dream to its source, and found it a mockery of those dreams, and she still cared! She moved me, that child.

"You, a human, show compassion towards me?" he said sadly. "I am truly shamed . . . I am so old, so senile, so insane now. . . ."

"But what will happen to you?" I said.

"Oh, *furengillat.* The Grand Ending. I have committed the ultimate crime, have I not? The crime of uncompassion."

"They'll execute you?" said Cindy.

"It's nothing. Tomorrow's my 7,266th birthday anyway. You get bored. You think I *like* being mad?"

"At least you know it. Most mad humans don't."

"Oh, get out of here," said the Selespridon, not unkindly. "The demat-booth's just behind that pillar," he pointed, "and you ask for level W444 to get out of Darkside. Your fellow bogeymen will be waiting there. . . ." And then—after a perfunctory display of thunder and lightning—he was gone.

The parents snapped to right away. "You're coming straight home, young lady!" said the father.

"But—" she looked at me imploringly. I looked at her. We'd been through a lot together. I wasn't the same person as when I had gotten up—was it only that morning? No, longer, surely, longer ago

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than that—and rolled into the office for the day's instructions. She was a beautiful kid.

And she needed me.

Something *had* been missing from my life.

As the girl looked at me, the Saturns whirling in her eyes and the delicate sari fluttering in the scented mist, I suddenly understood. . . .

Damn it, Dollie Salvador, I thought. *Maybe it's true that nobody loves you. You've moped about it for years, blamed it all on belonging to a loveless, unloveable profession—but maybe it isn't* all *because you're a bogeyman! Maybe* you *have to give more too, maybe* you *should start off by loving somebody—*

"I've been scared of committing myself. All my life I've been scared," I said to myself. And then, aloud, I said something incredibly foolish. I said, "Actually, she's not going back with you. You see, she's just deeded me just enough credit to buy up the remainder of her mortgage, and seeing how neglected she's been in the past, it seemed like the right thing to—"

"Rubbish," said the father. "We thumbed the payment through the minute you left. There is absolutely no way that you could prove that our claim was not the prior one. . . ."

"I'll sue!" I said angrily. I was committed now. In at the deep end. And I didn't care anymore. I wasn't afraid. I knew who the bogeyman really was. The bogeyman was my unwillingness to love or be loved, and he had been gnawing out my guts, piece by piece, all of my life. Now that I'd made the admission to myself, it was like throwing off thirty years' worth of shackles. "I don't care if you sue me right into a credit clinic! I don't care if I have to kidnap this kid and bash my head against the Selespridon Barrier until it cracks open!"

"You won't have to," said Cindy suddenly. I saw the triumphant grin on her face, the one that meant she was on top of things.

"What do you mean?" said her mother.

"Well, since Papa trusted me with the house paycomp, I took the liberty of messing around a little with our holdings."

"What? How dare—" began Mr. barJulian-Davies.

"I paid eighteen super-megacredits for all the mercury mining concessions on Mercury!" she said gleefully. "And in case you're wondering about the trouble with the paycomp and why you had to take the trouble to come personally to haul me off . . . the answer's simple! You're bankrupt!"

"Utter nonsense, you foolish child. We'll simply sell the art."

At this I couldn't contain myself. I started giggling and Cindy

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took it up too, and we were in stitches.

Calming down, Cindy said, "Since you *are* my ex-parents, I suppose Dolly and I will let you live in that monstrous house with us. Everything that's left belongs to me now, you know! You can't do anything about it because I had power of attorney under overcorporate law . . . actually I only kept the house and the art."

"You have some taste left, I see," her mother said bitterly, eyeing me furiously. "We scrimped and fought for that art. . . ."

"Indeed," said Cindy. "But as for selling the art . . . I've got other plans. I'm going to swing from the Brontosaurus chandelier until the bones break off, one by one—"

"Heavens! What will the barJulians think of us?" wailed her mother.

"Then I'll kick your coprokinetic sculpture into little pieces and—"

"No," I said, as my immense fortune finally dawned on me, "*I* get to kick the shit sculpture into little pieces! I'm the parent around here and I'll give the orders! *You* can spill coffee all over the Michelangelo coffee table—"

"And you can unstitch the laser-crochetings of *Iphigenia in Schenectady*—"

"We'll paint mustaches on Mount Rushmore—"

So this was what being a mother was all about.

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LETTERS

Dear Dr. Asimov:

You made a factual misstatement in your "Marching Morons" comments. I'd thought that you'd read everything and knew everything, but that is clearly not true for the field of economic history. A nation can get rich in one of three ways. It can extract tribute from other nations at bayonet point (like Russia from its East European empire), or it can be lucky enough to have a disproportionate share of a natural resource and then to reduce production in order to drive up the price (like OPEC with oil), or it can increase its productivity. The fact is, that in the past two hundred years bayonets have usually cost conquering countries more than the tribute they produced. OPEC is unique and a temporary phenomenon (their oil will soon be gone). Almost all growth in national wealth since James Watt has stemmed from increased productivity—*not* by one nation impoverishing another as you asserted in your article. And almost all nations have been getting richer—although their rates of growth do vary.

Sincerely,

Dr. Richard Bean
Department of Economics
University of Houston

I wouldn't dream of arguing with you, but when you increase productivity by importing raw materials at low prices and exporting finished products at high prices, you grow rich but the countries that sell to you and buy from you grow poor.

—Isaac Asimov

Dear Dr. Asimov,

I received six issues of your magazine in the mail, beginning in March 1980, one each month, and stacked them neatly in my bookshelf without cracking a cover. Then, a week ago, starving for something stimulating to read, after half-heartedly plowing through a ponderous historical novel, I grabbed up the dusty March issue and thumbed through it.

I have been rooted to the couch since, in a revel, consuming one copy of *IA'sfm* after another. My family can't budge me with a crowbar! They look hungry and can't find any clean underwear. They

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peer at the cover to see if I've gotten to the last issue yet. I'm afraid, however, their misery will continue, since I not only intend to renew my subscription but (the beast has really got me!) also request you send me editorial requirements and manuscript information.

I may end up a lonely woman at this rate. Will I even notice that they've packed up and moved out?

Here's to a job well done and continued success. You'll be hearing from me again.

Sincerely,

Ferne Campbell
Los Osos CA

It is a cruel thing to separate a woman from her family; to leave a wifeless husband and motherless children. And yet if that's the price of publishing a superlative magazine—so be it!

—Isaac Asimov

Dear Mr. Scithers:

In the January 19, 1981, issue of *IA'sfm* there appeared a Fact Survey concerning more, less, or about the same amount of science fact. I thought that the question deserved more than a simple check in the appropriate box (although I did send that item to the survey's New York, New York address).

Please! MORE SCIENCE FICTION, LESS SCIENCE FACT! Although you can and do print interesting science fact articles, there are already many other magazines devoted to this area: *Science Digest, Science News, Scientific American, Science 81,* and some others not so well known. There are so few really *good* science fiction magazines left. The best that you could probably hope for would be to cover something already hit upon in much more detail in one of the other science magazines. And this at the expense of precious pages that could have been devoted to good science fiction. Science fiction, I might add, that most of these science fact magazines don't and won't print.

Don't become another *Omni*! They printed more science fiction when they first started than now. In the November and December '80 issues they had 3 and 2 science fiction stories respectively. I was intrigued with a science fiction/science fact magazine at first, but *Omni,* it's sad to say, has slowly regressed into an essentially science fact magazine that occasionally prints science fiction—and not very good science fiction at that.

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There are few good markets for good science fiction. *IA'sfm* and *Analog* are two of the best. So please, leave the science fact for the other magazines and print instead what they can't—good quality, large quantity science fiction. Don't go the way of the other magazines by printing more science fact. Be a jewel amongst the pebbles instead of an unrecognizable stone amongst the other stones.

Sincerely,

Danny N. Batty
Albuquerque NM

One thing to remember is that science fact and science fiction are closely allied, and my own feeling is that the alliance should never be forgotten on either side. To print both is to nurture the alliance.

—Isaac Asimov

Dear Mr. Scithers,

Being a traveling salesman and addicted to your magazine has caused two problems. Haunting newsstands in airports, hotel lobbies, and out-of-town bookstores does not always produce the desired copy of your magazine. I have also found the glue which binds the pages softens and allows them to detach while sitting in the suana of the many racquetball clubs I frequent.

I have solved the first problem by subscribing (a Christmas gift to myself) and carrying the copy in my gym bag. The second problem still remains unsolved, but as I sweat I manage to read what doesn't disappear under the bench.

Please forward your editorial requirements for submission of manuscripts. I've been writing for 18 years and have achieved print twice but I'm still pounding away.

Sincerely,

John Kuhns
Northbrook IL

This isn't at all what I've been led to believe travelling salesmen did in their spare time. I'm so pleased.

—Isaac Asimov

Greetings:

I am a newcomer to *IA'sfm*, and I must admit I was a little leery about it. How could something the size of my sister's *Humpty-*

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Dumpty magazines have anything very good in it? Nevertheless, a too-tight budget that forbade book buying; plus a starvation for science fiction, forced the purchase of my first issue. Nothing *forced* the second purchase, or the third; and every issue so far has been read cover to cover, more than once. Now I believe that cliché about great things in small packages.

Your magazine is a little hard to find sometimes but definitely worth the effort. The stories are enthralling; and the nonfiction has been informative *and* enjoyable. As for your verbal practical jokes, I can take pun-ishment like that any time. I guess my only complaint is that it's not nearly long enough to last through the month. Would you consider making your magazine 29 or 30 times longer?

Please send me a discussion of your manuscript requirements. And, I'm sure glad I was once too broke to buy books.

Sincerely,

Glynda Kirkpatrick
Axbell NE

If you but knew the amount of work that goes into turning out a magazine just this length—

—Isaac Asimov

Dear Dr. Asimov,

Please send a copy of your requirements for manuscript format and story needs.

And by the way . . . I subscribed to *Isaac Asimov's Science Fiction Magazine* because a woebegone neighborhood child was having a hard time selling magazine subscriptions for her school. After hot cocoa and commiseration had settled her down, I took a look at the list of magazines she was selling. I understood her problem. Finally, just as I was resigned to throwing away a copy of *Ladies Home Journal* every month, I found your listing in the back of the brochure. I've always been a sci fi fan in a small way, so I thought . . . what the hell, why not.

Now that I've read three issues my only comment is that the sense of serendipity that Columbus should have felt is minor compared with mine. Good luck exists in Toledo.

Barbara Glowacki
Toledo OH

I think you owe the kid another hot cocoa. —And maybe a gift

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subscription for a friend?

—Isaac Asimov

Dear Dr. Asimov,

In your January 19 issue, you published a letter by a Mrs. Buchanan about SF-related music and the possibility of giving the discussion thereof some space in *IA'sfm* every so often. Your response was that the actual relationship of music to SF was perhaps a question of conditioning, and you cited a movie theme as an example. This is a valid point, to be sure, but there is some SF that could not exist without jointly written music. Particular favorites of mine include Genesis's "The Lamb Lies Down on Broadway" (which also steps across the thin line to fantasy) as well as at least a third of their earlier material, Nektar's "Remember the Future" and "Recycled," and much of the Moody Blues' work, most outstandingly "To Our Children's Children's Children." Also of special interest is the eclectic European band Planet Gong, whose music deals extensively with their own metaphysical mythology. And what about Hawkwind, a dominant factor in the writing and life of Michael Moorcock? A number of my own compositions, in fact, rely integrally and reciprocally on original SF literature, and I have a feeling that this may not be uncommon even these days among musicians more current than my own favorites. I think that Mrs. Buchanan's idea for a yearly review of this field is a superb one and that *IA'sfm* is just the magazine to do it.

With open ears,

Alan Lipton of Nautilus
3832 Larkspur Dr.
Concord, CA 94519

If we could find someone qualified to do it, I would have no objection. I cheerfully admit that I am a musical illiterate.

—Isaac Asimov

Dear Sirs:

Your "Slush Pile Strikes" comments have appeared in previous issues of *IA'sfm*. I couldn't disagree more. These may be the Golden Days of SF in terms of sheer volume of material being purchased and published, but I have never plowed through more (so-called) clever and ingenious plots by writers who really should not be en-

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couraged to continue in their literary careers, than in the past few years. The Good Doctor and his associates may feel proud if they wish to, for encouraging so much fledgling talent (?), but many of these people are not storytellers. Originality be damned. There *are* no tired plots; a real storyteller can rewrite the same yarn a thousand times and never fail to captivate me with his magic. I've been reading SF for just as long as Dr. Asimov, and cliché plots may upset your hip, sophisticated, younger readers. But reading pleasure for me comes from hurtling headlong into the web of fascination that a talented author *knows* how to spin. And there are damned few of them out there who have that *innate* ability. I don't think I am really being hardnosed about this, but "Slush Pile" followed the Sharon Webb story, which is so mediocre and so typical of the younger authors' output. Hello there, Sharon: I honestly heard your typewriter clacking away, on every single page. Never once did I become involved or transported by the story; but since you get paid for such material, I must grudgingly say Three Cheers For You, and no doubt your parents are proud of you. (Sure I'm being patronizing, but then I really don't think much of your writing ability). As for all these beginning writers who break into print for the very first time in the pages of *IA'sfm,* Archie Bunker perfectly expresses my feelings when he says: WHOOP-DE-DOO.

Irving L. Jacobs
National City CA

On the other hand, I love young fledgling writers because I remember being one a few short years ago. No one could have guessed then that I was going to be none other than I—so be more patient.
—Isaac Asimov

NEXT ISSUE

The November 23, 1981 issue of *IA'SFM* will mark the first-ever appearance of Kate Wilhelm in these pages. She makes her debut with a frightening tale called "With Thimbles, With Forks and Hope," and we hope that we'll see more from her in the not-too-distant future. In addition, we've got stories and articles by Alan Dean Foster, John M. Ford, and many more, including the cover story, "The Loom of Thessaly," by David Brin. On sale October 27, 1981.

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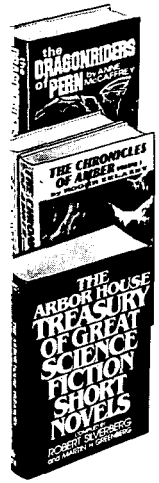

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